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# Annual Report 1980-1981

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Ministry of the Environment

Ontario

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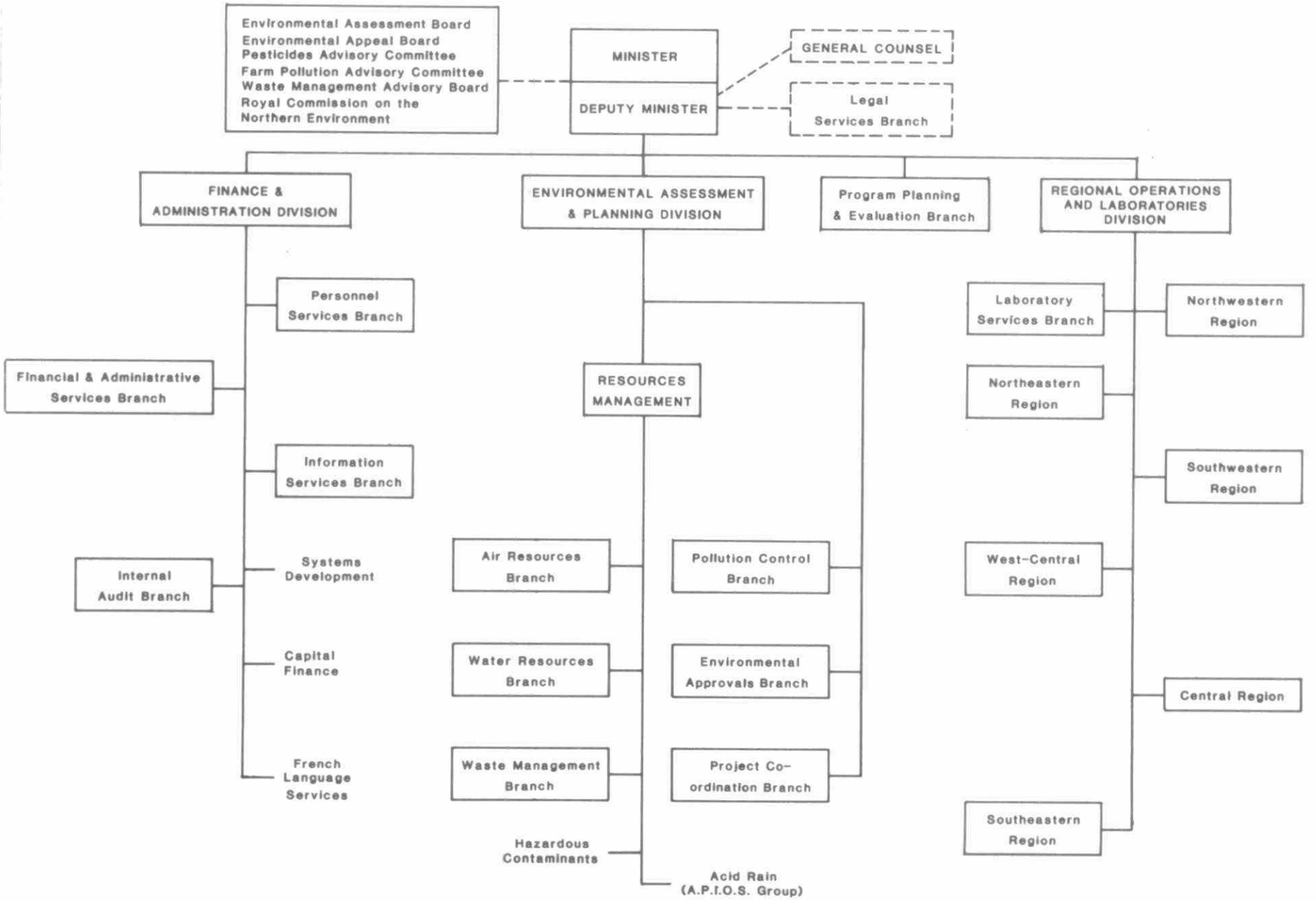
# MINISTRY OF THE ENVIRONMENT-April 1, 1981



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Ce rapport est également publié en français. On peut en obtenir un exemplaire en s'adressant à la librairie du gouvernement de l'Ontario ou aux bureaux régionaux ou de district du ministère de l'Environnement.

To:

The Honourable
Keith C. Norton
Minister.

Sir,

I have the honour to submit for your approval the annual report of the Ministry of the Environment for the year 1980-81.

Respectfully submitted,

Gérard J.M. Raymond,
Deputy Minister

To:

His Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I take pleasure in presenting the annual report of the Ministry of the Environment for the fiscal year beginning April 1, 1980, and ending March 31, 1981.

Respectfully submitted,

Keith C. Norton, Q.C.
Minister

*The Honourable Keith C. Norton, Q.C. was appointed Ontario Minister of the Environment on April 10, 1981, transferring from his former portfolio as Minister of Community and Social Services, an office he had held since February 1977.*

*During the 1980-81 fiscal year, the Honourable Harry C. Parrott, D.D.S. served as Minister of the Environment. Dr. Parrott was Minister from August 18, 1978 to April 1981, when he retired from political office.*

*Gérard J.M. Raymond was appointed Deputy Minister of the Environment on September 8, 1981. Prior to this, Mr. Raymond was Deputy Provincial Secretary of the Secretariat for Resources Development.*

*Graham W.S. Scott, Q.C. served as Deputy Minister of the Environment from February 5, 1979 to September 8, 1981 when he was appointed Deputy Minister of Health.*

# Achievements 1980-81

The goal of the Ministry of the Environment is to achieve and maintain a quality of the environment, including air, water and land, that will protect human health and the ecosystem and will contribute to the well-being of the people of Ontario.

To achieve this goal, the Ministry has established the following programs:

1. Ministry Administration Program
2. Environmental Assessment and Planning Program
3. Environmental Control Program
4. Waste Management Program

The Ministry is committed to providing efficient, direct service from six regional and 23 district offices. They serve as key delivery points for inspection and pollution abatement activities, local approvals and services and quick, effective action on pollution problems.

The Ministry enjoys a close working relationship with municipalities, particularly in providing consultation and development services for water management and pollution control.

Important activities and achievements have included:

- the start of a broad attack on the problem of acid rain in Ontario;
- taking positive action to deal with Ontario's liquid industrial waste problem;
- further construction of water and sewage systems, including completion of 26 municipal water works and 32 municipal sewage works;
- expansion of the Ministry's laboratories and laboratory services, including the addition of new scientific equipment and research facilities to improve the detection, analysis and control of hazardous contamination;
- continued progress in air pollution abatement, resulting in a substantial improvement in the air quality of major industrial urban centres;
- a province-wide investigation of unrecorded waste disposal sites.

More details are given below and in the individual reports of Divisions and Operating Branches.

## Acid Rain

Acid rain in eastern North America is due to pollution from sulphuric and nitric acid which originates chiefly from the combustion of fossil fuels, such as coal and oil from generating plants, ore smelting, petroleum refining, industrial furnaces and

from cars and vehicles of all kinds. Over half of Ontario's acid loadings from the atmosphere come from the United States.

Scientists estimate that if 1980 levels of acid loadings remain constant or increase over the next 10 to 20 years, Ontario could lose much or all of the aquatic life in as many as 48,000 susceptible lakes which have little or no limestone to neutralize the acid.

The transboundary nature of acid rain creates numerous national and international regulatory problems. Where air pollution standards differ, lax standards in one jurisdiction can allow pollutants to have a direct impact on the natural resources of another jurisdiction. Canada and the United States are consequently exploring ways to integrate and co-ordinate their scientific programs, and to reach a formal accord for abatement action.

A first major step toward negotiation of such a treaty between the two countries was taken in Washington on August 6, 1980 when a memorandum of intent to curb acid rain and resolve international air pollution problems was signed. Ontario was one of the prime movers behind the memorandum.

In November of 1980, a booklet entitled, "The Case Against the Rain" was published by the Ministry. The report describes the extent to which Ontario is affected by acid rain, the progress the Province has underway to meet the challenge and addresses the need for action both in Canada and the U.S. to curb acid rain pollution.

Copies of the report were mailed to U.S. senators and congressmen representing the northeastern states, where much of this type of pollution originates.

Ontario's stand was further emphasized in February of 1981, when Premier William Davis discussed the acid rain problem with governors of the Great Lakes states, and again in March of the same year when a presentation on acid rain was made to U.S. officials during the Ottawa meetings of President Ronald Reagan and Prime Minister Pierre Trudeau.

Also in March, the Ministry of the Environment filed a legal intervention with the U.S. Environmental Protection Agency (EPA) which asked the EPA to reject proposals from six states for a relaxation of emission limits governing 18 power plants.

In addition, Ontario asked the EPA to enforce existing emission limits on sources not in compliance, to review the regulations on emission levels governing 11 U.S. power plants and to consider control needs from the perspective of total effect on northeastern North America.

The Ministry of the Environment later filed a new submission to the EPA, expanding its earlier document to include two large power plants in Ohio.

However, the Ministry is not concentrating its efforts solely on the U.S. In May of 1980, Inco Ltd., the smelting operation in Sudbury which represents the largest single point source of sulphur emissions in North America, was ordered to reduce its emissions from 3,000 tons to 2,500 tons per working day and to have facilities in place by the end of 1982 to produce only 1,950 tons per working day. A task force was appointed to determine how these emission levels could best be reduced to a further minimum.

In January of 1981, the Ministry placed annual limits on the emissions from Ontario Hydro, which require the utility to undertake approximately $500 million worth of control activities immediately. Ontario Hydro, a crown corporation which supplies almost all of the Province's electrical energy, is the second largest emitter of $SO_2$ in the Province.

Other important aspects of the acid rain problem under study include the socio-economic effects of acid rain on Ontario areas which are affected or threatened and the sources and paths of long-range transboundary pollution.

In the summer of 1980, new networks of air monitoring stations consisting of instruments to measure deposition and to identify sources of acid rain and other pollutants related to long-range air transport were set up in 45 locations throughout the Province.

This "Atmospheric Deposition Study" is only one of a number of scientific investigations which are taking place under the Acid Precipitation in Ontario Study (APIOS). Through this major study, which is costing over $5 million, Ontario is compiling essential scientific information required to better link and assess the source and receptor relationship of acid rain as a means of establishing effective abatement measures.

As a measure to assist development of permanent acid rain abatement programs here and in the United States, Ontario is pursuing an experimental program to determine if it can neutralize selected water bodies against further environmental damage. The program involves the addition of a neutralizing agent, calcium carbonate, slaked lime and/or limestone to affected lakes, in an attempt to restore their buffering capacity.

## Air Quality

Toronto's air quality has improved so much in the past decade that there have been no air pollution alerts since 1979. Sulphur dioxide levels have dropped by 80 per cent and dust levels by 50 per cent.

The level of suspended particulate matter, the main pollutant in Hamilton, has decreased across the city ranging from 21 to 58 percent, mainly as a result of the abatement of emissions by the steel industry.

In Sudbury, since the inception of the Air Pollution Index in 1971, the number of occasions which the Index exceeded the Advisory Level of 32, has dropped from 26 to no alerts in 1980.

Similarly, the air quality of other industrial cities such as Windsor, Sarnia, Welland, St. Catharines and Cornwall has also improved since 1970.

## Fish Testing Program

Further tests of sport fish from over 250 new lakes and river locations during the past year confirmed that the majority of Ontario waters yield healthy fish.

Ministry staff tested over 11,000 fish from these lakes and rivers in 1980 as part of Ontario's continuing long-term program. This new information is now combined with results from 625 waterbodies previously tested and reported—bringing the total tests to over 54,000 fish from 878 locations.

For the fifth consecutive year, the Ministry published its findings regularly in Environmental Health Bulletins and summarized the results of the fish testing program in bilingual booklets, entitled, "Guide to Eating Ontario Sport Fish".

Over 190,000 of these booklets were distributed free of charge in 1980-81. This unique testing and information program recognizes that every angler fishing in Ontario has the right to know if it is safe for him and his family to consume the fish they catch. In no other jurisdiction is the angler and the public given such consideration.

## Industrial Wastes

The disposal of liquid industrial waste is a major problem in Ontario. Industry currently produces over 60 million gallons a year. Approximately 11 million gallons is disposed of in the remaining eight sanitary landfill sites in the Province, which are still accepting liquid wastes. About 5 million gallons are exported outside the Province. The remainder is incinerated, reclaimed, or disposed of in private landfill sites, at sludge farms, or sewage treatment plants.

The Government has decided to deal with this situation and to develop a comprehensive industrial waste program, including the development of facilities.

In 1979, the Ministry of the Environment commissioned an outside consulting firm to review technology and site requirements and then to recommend a location where major facilities could be constructed.

In November of 1980 a final recommendation was made by the consultant suggesting a site on land at South Cayuga. This site was proposed subject to further studies, including extensive geological testing, a geotechnical survey and the proposal was to be considered at public hearings.

The new waste facilities will be planned, developed and operated by the newly formed Ontario Waste Management Corporation.

The Ontario Government has also appointed a three-member panel to conduct public hearings into the safety and suitablility of the proposed site. The Hearing Officers have been directed to review existing data on site engineering, hydrogeology, geology and geochemistry. They are also required to meet with parties interested in or affected by the proposal.

After all the evidence is in, the panel will make its decision on site suitability. If it should be negative, the Government will accept the findings and the corporation will be instructed to find another site.

Also in keeping with the Ministry's attack on the liquid industrial waste problem, was the formation of a special task force of environmental detectives to crackdown on the illegal dumping of these wastes and other pollution offences. The thirteen people appointed have been trained in investigative techniques to serve as a special environmental police unit to assist the Ministry in enforcing Ontario's environmental laws.

Ministry staff completed a Province-wide investigation of previously unrecorded municipal waste disposal sites. They located 1,450 sites, of which 197 were marked for further study. In addition, as a precautionary measure, environmental consultants for the Ministry investigated 50 privately owned industrial waste sites across Ontario. Fifteen sites were still operating and the balance were closed sites formerly used for industrial waste disposal. As a result of the three month study, further investigation and remedial work was ordered on 11 sites and 26 sites were marked for further monitoring and study.

## Servicing Development

Two large projects developed by the Ministry of the Environment were officially opened in October, 1980—the first stage of the York-Durham Water Pollution Treatment System and the Lorne Park Water Purification Plant.

The York-Durham Water Pollution Treatment System, under construction since 1975, is the largest project undertaken by Environment Ontario and the largest planned sewage system in Canada.

The Lorne Park Water Purification Plant is North America's first major underground water treatment plant.

# deputy minister

Deputy Minister—Gérard J.M. Raymond
Executive Assistant—R.G. Clark

## Program Planning and Evaluation Branch

Director: A. Castel

The role of the Program Planning and Evaluation Branch is to identify the broad program and resource needs of the Ministry and to co-ordinate the effective management and efficient utilization of Ministry resources. There are three main areas of responsibility.

First, the Branch analyzes Ministry policies and programs, co-ordinates policy development and provides liaison with the government's central agencies including the co-ordination of policy submissions. During 1980-81, the Ministry policy approval process involving maintenance of a Ministry Policy Manual was implemented.

Secondly, the Branch develops and maintains Ministry strategic and operational planning systems. Support was given to the Strategic Planning Committee in rewriting the Ministry's goal statement and in developing a strategic planning process. The Branch will be acting as a permanent secretariat once the process is active.

Thirdly, the Branch provides socio-economic analysis of environmental concerns and of the impact of economic activities on the environment. Increased emphasis has been placed on the development of methodologies for assessing the economic effects of acidic precipitation.

The following reports were released in 1980-81:

1) Manual of Environmental Policies and Guidelines;
2) Work Program and Budgetary Implications, 1980-81;
3) Management by Results, 1979-80 Year-End Report;

In addition, major studies were initiated in 1980-81 to investigate the socio-economic implications of the acid precipitation phenomenon.

# Legal Services Branch

Director: J.N. Mulvaney, Q.C.

Staff of Legal Services Branch are employed by the Ministry of the Attorney General and provide legal services on a solicitor/client basis to the Ministry of the Environment.

A major function of the Branch is to conduct prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any Director whose decision under a statute is being reviewed in a hearing before the Environmental Appeal Board or other review tribunal.

On one occasion during the year, injunction proceedings were taken to bring about compliance with Ministry orders.

During the year, under the Environmental Protection Act, 1971, 78 cases were before the courts, 37 of which resulted in convictions, 10 were dismissed, seven withdrawn and 24 still before the courts. There were six appeals from the cases convicted and dismissed.

Under The Ontario Water Resources Act, there were 27 cases before the courts, 15 of which resulted in convictions, five were dismissed, one withdrawn and six still before the courts. There was only one appeal from the cases dismissed.

Under The Pesticides Act, 1973, there were six cases before the courts, five of which resulted in convictions and one dismissed, which is being appealed.

During the year, the Legal Services Branch has become involved in Ontario's submissions to the U.S. Environmental Protection Agency with respect to acid precipitation and the formation and training of the Special Investigation Unit.

# environmental assessment and planning division

Assistant Deputy Minister—J.W. Giles
Executive Director—W.B. Drowley

## Air Resources Branch

Director: G. Van Volkenburgh

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology and recommendations concerning air quality criteria and standards.

### Air Quality and Meteorology

The main responsibility of the Section is to provide a comprehensive knowledge of the air quality in Ontario with respect to any measurable contaminant and a systems approach to air management. The Section maintains the data base and telemetering system of Ontario's monitoring network which in 1980-81 constituted approximately 1250 instruments located in 125 areas.

The following pollutants are routinely monitored: sulphur dioxide, nitrogen oxides, carbon monoxide, ozone, hydrocarbons, total reduced sulphur, fluoridation rates, dustfall and total suspended particulate matter, including components such as sulphates, nitrates, lead and other trace metals.

The Section develops and applies mathematical models to compute the quality of air and dry and wet deposition (acidic precipitation) of contaminants.

The Ontario Air Pollution Index, the basis for the Ontario Alert System, continued to be monitored and publicized daily for Windsor, Sarnia, Hamilton, Niagara Falls, Toronto, Sudbury, Coniston, New Sudbury and St. Catharines.

## Atmospheric Research and Special Programs

The Monitoring and Instrumentation Unit monitors air quality in special locations (using mobile facilities) for conventional and non-routine air pollutants in support of Ministry pollution abatement programs. The development and evaluation of new instrumentation to measure the concentrations of non-routine air pollutants is also a primary function.

**Extensive Air Monitoring Surveys 1980-81**

| Compounds | Location | Source |
|---|---|---|
| Organic Compounds | Junction Triangle (Toronto) | diversified industrial plants |
| Sulphur Dioxide Reduced Sulphur Compounds | New Toronto | rockwool manufacturing |
| Organic Compounds $SO_2$ and Particulates | Clarkson | petroleum refineries |
| PCBs | Smithville | disposal and transfer site |
| Organic Compounds Odours | London | sewage treatment plant |
| $SO_2$ | London | train derailment |
| Hydrocarbons | Nanticoke | oil refining |
| Oxides of Nitrogen, Carbon Monoxide Particulate | Kitchener | downtown traffic |
| PCBs | Thunder Bay | transformer explosion |
| Hydrocarbons and Particulate | Toronto | rubber plant fire |

In August, 1980 the Mobile Air Monitoring Unit (MAMU) was damaged by fire and was out of commission until the summer of 1981.

The Trace Atmosperic Gas Analyzer (TAGA 3000) System is a mobile mounted mass spectrometer which has an ambient air monitoring analytical capability for a wide variety of new generation pollutants, including those present in only trace amounts. These pollutants include chlorinated hydrocarbons, styrenes, methylamines, nitrosamines and many more.

The major use of the TAGA during 1980 was in the area of polychlorinated biphenyl (PCB) monitoring. Surveys in the vicinity of chemical plants in Elmira and Hamilton were carried out.

The TAGA Unit was taken out of service in August, 1980 due to an electrical wiring problem and became operational again in early 1981.

During the 1979-80 and 1980-81 fiscal years, the Unit was instrumental in the development of a combined field sampling methodology and laboratory analytical technique for ambient air PCBs. A three-phase Report describing the developmental work is now close to completion.

The Special Studies Unit is responsible for the co-ordination of activities under the Nanticoke Environmental Management Program (NEMP) and for carrying out the atmospheric chemistry and deposition (wet and dry) programs of the Sudbury Environmental Study and the Acidic Precipitation in Ontario Study.

The following were the major Nanticoke Environmental Management Program activities in 1980-81:

- An extensive monitoring network for gaseous and particulate pollutants including real-time data telemetry.
- Airborne and ground based studies on dispersion and chemical transformations of emitted pollutants.
- Mathematical air quality models for use in a supplementary control system for the area.

Major activities undertaken as a result of the Acidic Precipitation in Ontario Study included:

- the implementation of cumulative and event deposition monitoring networks to determine the wet and dry deposition fields of acids and related compounds in Ontario and the characterization of acid precipitation episodes;
- the establishment of a deposition network data base compatible with related data bases in North America; and
- the undertaking of studies to elucidate atmospheric chemical processes involved in acid precipitation, atmospheric transport and impacts of emission from local sources.

Staff published eight reports on work carried out during the active field phase of the Sudbury Environmental Study.

The Atmospheric Contaminants and Research Planning Unit assesses the potential, the possible consequences and the ultimate fate of hazardous contaminants in Ontario's air.

The Unit is also responsible for managing the Air Resources Branch Research Grants Program designed to stimulate air-related environmental research in Ontario universities.

During 1980-81, eight background reports on hazardous contaminants were completed, as well as 16 chemical dossiers.

The research grants information booklet ARB—TDA—56-80 was also revised and released.

During the year, five research projects were sponsored through the Unit involving $136,000. Three

of these projects were carried out by external organizations.

A further 19 research projects were sponsored through the Research Grants program for a cost of $280,000. This money was received by various universities and one community college.

Unit staff also managed five research programs under the Provincial Lottery Trust Fund Sponsorship.

## Emission Technology and Regulation Development

The three units under the Emission Technology and Regulation Development Section carried out a wide range of activities in support of the Air Resources Branch.

The Regulation Development and Environmental Assessment Unit, formerly the Cirteria Development and Program Planning Section, is responsible for developing standards and guidelines for new contaminants; revising and developing air regulations and guidelines; and, reviewing the air quality components of environmental assessments.

During the year, eight guidelines for new contaminants were established and approximately 30 Environmental Assessments were processed. Section staff were also involved in the revision of 0.Reg. 15, and assisted in the development of the Ontario Hydro Regulation (0.Reg. 73/81) as well as the Sarnia Area Regulation (0.Reg. 151/81). The Section initiated the review and updating of the existing criteria for Incinerator Design and Operation. In conjunction with the Ministry of Labour, staff instigated a survey of fluoride emission and health effects.

The Control and Process Technology Unit, which replaced the New Technology Unit, assesses new technology for industrial processes at the request of the Ministry's Regional and Approvals Branches. It also reviews specific industries to enable specification of control technology options for standard and guidelines and examines literature for new development in control and process technology.

During the year, the unit undertook intensive review of the electrical power and major non-ferrous smelting operations in Ontario particularly with reference to reducing acid precipitation and undertook work for the Long Range Transport of Air Pollutants Abatement and Strategy Committee.

The Hazardous Contaminants Information System was expanded. Staff co-ordinated the arrangement for test destruction of PCBs. They also reviewed Ontario Hydro operations and costs with reference to development of the Ontario Hydro Regulation.

The Source Measurement Unit, which replaced the Source Assessment Unit, is responsible for reviewing the source testing reports from the regional offices; updating the source testing code; and, the production of reports on special areas of concern.

In 1980-81, staff developed specialized methods of testing for PCBs, dioxins and other hazardous chlorinated compounds from thermal incineration and completed reports on polynuclear aromatic hydrocarbons from coke ovens, odour emissions from restaurants, refinery plants, auto paint shops, and hydrocarbon emissions in Nanticoke.

## Phytotoxicology

The Phytotoxicology Section conducted soil and vegetation assessment studies near 104 industrial and other sources in Southern Ontario.

The Section also investigated 206 vegetation complaints from the public; 40 per cent of these were confirmed as being caused by pollutants.

The Section collected 9,667 vegetation and soil samples for laboratory examination. In addition, a number of research studies both in the field and in controlled environment greenhouse and growth chamber facilities were conducted.

During the 1980 crop-growing season, staff conducted extensive field assessment surveys to determine the degree of photochemical oxidant (ozone and/or peroxyacetyl nitrate), injury on white bean, tomato and potato crops. Oxidant injury to crops was more severe in 1980 than in 1979.

At Nanticoke, the Section continued studies where major operations by Ontario Hydro, Stelco, and Texaco are ongoing. No fluoride or sulphur dioxide injury has been observed on vegetation in the study area to date, but ozone injury has occurred annually on established indicator plants.

Ethylene studies were conducted in the laboratory and in the field near Sarnia to determine the effects of ethylene emissions from polyethylene manufacturers. The data obtained in these studies will help in the formulation of air quality criteria and standards for ethylene.

Several field investigations were conducted in the vicinity of industries emitting atmospheric fluorides. Control orders have been issued to certain fluoride emitting industries in which compliance with acceptable vegetation effects is necessary. Fluoride studies were continued in 1980 on the St. Regis Indian Reserve, Cornwall Island to define the current area of contamination resulting from fluoride emissions from Reynolds Metals Co., and Aluminum Co. of America, Massena, New York. The results of these studies were provided to the Indian Band, the companies, and the federal government to assist in a pending lawsuit.

## Vehicle Emissions

During 1980-81, staff stopped 6,023 cars in 19 locations throughout Ontario in spot checks for emission controls and exhaust pollutant levels. Of these, 3,046 cars failed to meet Ontario emission guidelines, while 344 had pollution control equipment missing, disconnected or inoperative. Charges were laid against five owners. Four were found guilty and fined. The remainder were corrected by owners on a voluntary basis.

Section inspectors visited 445 used-car dealerships and inspected 2,544 cars. As a result, 95 Violation Notices were issued; 92 were satisfactorily cleared before the vehicles were sold. The remaining three are in the process of being cleared.

Highway patrols in co-operation with OPP personnel resulted in 450 vehicles being stopped for excessive smoke emissions. Subsequently, 82 warnings and 368 charges were issued by the OPP. Vehicle owners on 268 cases were found guilty and fined; seven cases were dismissed; 93 cases were pending at year-end.

# Water Resources Branch

Director: D.N. Jeffs

The Water Resources Branch provides a number of services and programs, including water resources planning and co-ordination and the develoment and implementation of policies and guidelines relating to water resources protection and management. The Branch co-ordinates and gives policy direction for inventory programs and data processing and analyzes and publishes monitoring and inventory data. It provides specialized technical advice to assist Regional staff and technical training and method development in support of Ministry programs. It also provides inter-agency liaison and technical representation on committees supporting the International Joint Commission (IJC) and inter-ministerial activities.

## Water Management

The Water Resources Branch assisted in the preparation of Branch position papers on "The Recommended Criteria for Pumping Tests for Small Communal Ground Water Supplies" and "The Application of the Drinking Water Objectives to Ground Water Supplies in Ontario" to assist in establishing a uniform approach for Ministry approval of small communal water-supply systems.

The Branch provided input to the Ad Hoc Committee on the Underground Storage of Petroleum Products in consultation with the Ministry of Consumer and Commercial Relations (MCCR) on the pre-1974 underground tank replacement program; staff helped to prepare guidelines on land use, monitoring and mitigation as part of the MOE Landfill Gas Committee and provided technical input to the Maple Landfill Committee.

By year end, staff had issued 488 drilling and boring licences and licensed 35 contractors for the first time.

11,108 water-well records had been received for processing. The Branch sponsored a one-day water-well drilling conference on well grouting techniques at Kemptville for water-well drilling contractors and their employees.

Staff participated in a number of inter-agency liaison activities to promote mutually compatible policies and programs. These included: participation in preparation of a joint report to senior management of the Environment and Natural Resources ministries; proposing solutions to problems involving overlapping responsibilities in fisheries and water-resources management; participation in a Federal-Provincial Working Group on Recreational Water Quality; and co-ordination of MOE input to CORTS policy statements involving the management of the Rideau-Trent-Severn waterways.

Staff co-ordinated and participated in the activities of an implementation committee and five subordinate working goups to develop implementation procedures for the newly-developed policies and water quality objectives for management of the quality and quantity of Ontario's surface and ground water. Significant issues addressed by the working groups included the development of municipal effluent requirements, policies and procedures; surface water-quality assessment procedures; and, policy and procedures for resolution of ground-water quality interference problems.

To keep anglers in Ontario fully informed on possible contaminants in sport fish and the safety of eating or feeding their families the fish they catch, the Ministry co-ordinated the collection of information on trace contaminants such as mercury, PCBs, mirex and DDT from a variety of fish species collected throughout Ontario.

During 1980-81, the Ministry issued three environmental health bulletins containing new or updated information on contaminants in fish, In April, 1980 it published a series of bilingual booklets under the general title "Guide to Eating Ontario Sport Fish" for Northern Ontario, Southern Ontario and the Great Lakes. The booklets contain information on 54,000 fish

taken from 878 waterbodies; more than 190,000 copies were distributed free of charge.

The section has also undertaken a study to determine the potential of wetlands for year round sewage treatment. In particular, the studies are attempting to ascertain the degree of pretreatment of the waste necessary prior to discharge to the wetlands, loading rates and retention times for optimal operating conditions, land requirements and operational costs. To assist in the study, the Ministry is using two marshes. One is an artificial system constructed adjacent to the Town of Listowel's sewage treatment lagoons. It commenced operations in August 1980. It is composed of five separate treatment systems and a small control marsh to be used for monitoring rates of evapotranspiration. All cells, except the pond, have been compacted and backfilled with a mixture of sub-soil, top soil and peat and planted with cattails.

The other marsh is a long-standing natural marsh in Bradford. It was monitored for two years to establish natural nutrient fluxes. Sewage additions (mixed raw sewage and final effluent from the Bradford Sewage Treatment Plant) to this natural marsh commenced in June 1981. Both the quantity and the strength of the sewage can be varied to assess the performance of this marsh at different sewage loadings.

The Lakeshore Capacity Study is a multi-ministry co-operative project to develop predictive models concerning the effects of human development on lakes and their watersheds, particularly the capacity to accept recreational development. Field work is now completed. Compilation of results continued and final reports are in preparation.

**Grand River Study**

Activities related to the Grand River Basin Water Management Study continued with 1980-81 being devoted essentially to the finalization of information analysis, the evaluation of management alternatives and the preparation of the final report and supporting documents. The study is being carried out under the direction of the Grand River Implementation Committee consisting of representatives from five Ministries (Agriculture and Food, Environment, Housing, Intergovernmental Affairs and Natural Resources) and the Grand River Conservation Authority.

In addition, the final report of an inventory of ground-water resources in the Grand River basin was prepared by the Branch. This report addresses general aspects of hydrogeology and future development of ground-water throughout the basin and provides in-depth analysis of ground-water potentials for water supply for 23 communities in the basin, including the Regional Municipality of Waterloo.

In co-operation with the Grand River Conservation Authority, a continuous streamflow data base was completed for the basin, rainfall patterns were examined and flow frequency analyses were conducted for the evaluation of reservoir operations as well as predictions of storm runoff and low summer streamflow probabilities.

**Stratford-Avon River Environmental Management Project**

Activities related to the Stratford-Avon River Environmental Management project commenced in 1980. The project is being conducted in co-operation with the Pollution Control Branch, the City of Stratford and the Upper Thames Conservation Authority.

In the first year of this two year study, information was assembled on water quality, aquatic plants and algae, hydrology and pollutant loadings from sewage treatment plants, industrial discharges and agricultural areas. Demonstration projects of remedial measures were initiated in-stream and in the urban and rural areas. The relative significance of the pollutant inputs from various sources has been identified.

## Water Resources Inventories

The last of a series of reports entitled "The Hydrogeology of the IFYGL Moira River, Wilton Creek and Thousand Islands Study Areas"; Water Resources Report 5e, was released. The report summarized the field studies undertaken by the Ministry on the Lake Ontario drainage basin as part of the International Field Year for the Great Lakes—a joint Canadian and United States contribution to the International Hydrological Decade (IHD).

The water resources study of the Humber River and Don River basins was continued and a similar study was initiated in the Credit River basin. These studies are designed to provide an inventory base for future water resources planning.

Water resources data were released in three publications.

In addition, a series of maps showing the location of observation wells, streamflow and water-quality stations in the Ministry's monitoring networks were released in three separate publications.

Water well information obtained from licensed drilling and boring contractors was published for five counties in Water Resources Bulletin 2-25, "Water Well Records for Ontario; Bruce, Dufferin and Grey", 1946-1976 and Water Resources Bulletin 2-26, "Water Well Records for Ontario; Wellington and Waterloo", 1946-1976.

Regional liaison meetings concerning all stations in the Provincial hydrometric networks (observation well, streamflow and water quality) were held to improve the networks efficiency. New stations terminated to eliminate redundancy. Monitoring for topic contaminants was continued at selected stations in the Provincial water quality network. Improvements were made to data processing procedures to provide more cost-effective analyses and interface with retrievals from the computer master files.

Water quality trends for phosphorus, nitrogen

and suspended and dissolved solids are being investigated in southwestern Ontario. Generally higher average concentrations are experienced in the southwest than in other areas of the Province and historic changes in water quality are being related to changing land uses.

## Engineering, Scientific, Technical and Administrative and Data Services

Geophysical surveys involving seismic, resistivity, gravity, well logging and magnetometer techniques were undertaken to assist in the investigation of ground-water contamination problems, ground-water development projects, hydrogeological investigations for waste disposal sites, geological mapping for construction materials and the location of buried metal containers containing hazardous materials.

Ground-water surveys were undertaken for seven municipalities and nine test-drilling projects were supervised. Well performance tests were conducted for four municipalities. Ground water interference problems were investigated for five municipal projects including the York-Durham project.

A guide for ground-water users, entitled "Water Wells and Ground Water Supplies in Ontario", was released. Included in this public information document is basic information on factors which affect the occurrence, the quantity and quality of ground water, a synopsis on well construction, and a discussion of common problems associated with wells and water-supply systems.

## Environmental Impact Assessment

Staff also co-ordinated the Branch's review and provision of technical comments on nine Class EA documents, 25 individual EA documents and advice and guidance on nine pre-submission EA documents. Assessment and advice was also provided on the mitigation of Ontario Hydro activities with potential effect on water resources, such as thermal discharges, impingement of fish, entrainment of larvae, intake and outfall configurations, and emission of contaminants for developments at Pickering, Darlington, Bruce and Nanticoke.

In addition, staff provided an assessment of marine construction activities such as dredging and dredging disposal; landfilling; river crossings (dredge, pipelines, etc.); underwater construction (intakes, outfalls, electrical cables, etc.); and erosion and sediment control as related to urban construction activities, in the following areas: Keating Channel, Eastern Headland, Sam Smith Landfill, Southeast Bend Cutoff, Haldimand Norfolk Water Treatment System, Darlington G.S. and Wesleyville G.S.

The co-operative association with Environment Canada through the bioassay testing program continues to generate fish toxicity test results on industrial wastes discharged to receiving waters throughout the Province. These are used to enforce the Canada Fisheries Act and address concerns in the Great Lakes identified through the Canada/U.S. Agreement on Great Lakes Water Quality.

Major emphasis has been directed toward assessment of pulp and paper mills in the Thunder Bay area over the last two years.

On-site industrial evaluations in the Cornwall area were completed using continuous biomonitoring techniques with rainbow trout, daphnia (water-flea) and fish eggs. Biological data will be incorporated into hydrological models developed for the St. Lawrence River to identify limited use zones.

Selected industrial waste discharges identified by regional offices are routinely tested and biological toxicity associated with specific compounds is determined. The segregation and identification of toxicants provides direction for regional staff to recommend appropriate effluent treatment thus reducing the biological impact of wastes in receiving waters. Major investigations have been completed in the Elliot Lake area and in Espanola, into gas fracturing in Lake Erie, textile plants in Cambridge and Cornwall, chemical manufacturing at Elmira, zinc derailment in Timmins, into tannery wastes in Acton and Aurora, waste disposal site leachates in Sarnia, air strip derubberizing agents for Transport Canada and an electroplating operation near London.

Preliminary investigations of the toxicity of chlorinated phenols and benzenes have been completed on single and mixtures of compounds. This information has provided guidance to a Lottery project underway at Lakehead University to determine the effects of these compounds on fish reproduction and bioaccumulation. Data will be used to establish scientifically defensible discharge objectives.

Collection of young-of-the-year spottail minnows dating back to 1975 throughout the Great Lakes has continued to indicate general declines in PCB, DDT and mirex as a result of regulatory and voluntary restrictions in use. Young yellow perch data have indicated potential PCB sources of continued release and have allowed regional staff to address problems near the Ganaraska, the Thames River, and have assisted in the development of objectives for restricting PCBs in road oil used for dust suppression.

## Cartography and Drafting Services

In servicing the cartographic, drafting, graphic artwork and reproduction needs of the Ministry, Branch staff completed 203 multi-color and mono-color maps and prepared 1,280 drawings, figures and illustrations.

## Inland Lakes

### Acid Precipitation in Ontario Study

Staff from the Ministry's Inland Lakes Section were deeply involved in the Acidic Precipation in Ontario Study (APIOS). They continued intensive sampling and analysis of the eight major study lakes near Dorset and their 31 associated watersheds. Programs for intensive work during the period of spring melt were undertaken in conjunction with the University of Toronto. Analysis and workup of data are continuing.

The report entitled "Acid Sensitivity Survey of Lakes in Ontario" was released in March 1981. Information from more than 1500 lakes in 32 Districts and Counties was compiled and analyzed for this report.

The Branch participated in several public relations and lecture activities relating to APIOS and several conferences, meetings and workshops both in Canada and the United States. Considerable effort was devoted to the synthesis of the Work Group I (Aquatic Effects) Report in support of the Canada/U.S. Memorandum of Intent to negotiate controls on long range transport of $SO_2$.

The Branch continued to use yellow perch to monitor metal levels in fish from acid stressed lakes. Results are compared to water quality characteristics to identify conditions that contributed to elevated metal levels observed in depressed pH lakes.

Laboratory studies are being completed to determine the levels of aluminum that contribute to mortality in fish embryo-larval life stages during rearing in acidic and other water conditions. Laboratory results will be confirmed in the field during the following year. Additional tests are being completed on mature fish to identify physiological functions that are being affected under acidic conditions.

Another project involved the proposition that acidified ground-water can be corrosive to water distribution plumbing systems and create a potential health hazard by leaching of trace elements into drinking water. Consequently, the Ministry undertook a synoptic survey of ground-water quality in the Canadian Shield area of the Province to determine the range of ground-water pH values, with special emphasis on low values as indicators of ground-water acidification.

The results indicated that there are areas of potential acidification and a preliminary network was established to monitor for seasonal variations.

All the fieldwork for the Sudbury Environmental Study has been completed and reports are now being prepared. The study involved intensive monitoring of seven lakes in the Sudbury area. The acidic control lake, Clearwater Lake, was monitored for seven consecutive years. This represents the world's longest continuous monitoring program on an acidic lake.

## Great Lakes Program

The Great Lakes program is a federal/provincial cost-shared surveillance, investigation and assessment program providing the data and information required for defining existing environmental conditions and trends in the nearshore areas and connecting channels of the Great Lakes, and determining cost-effective pollution abatement and prevention measures necessary to restore and maintain water quality in accordance with Provincial objectives and the objectives of the Canada-U.S. Agreement of 1978.

1980 saw a continuation of the trend toward greater stability in water quality conditions throughout the Great Lakes in response to international efforts over the last decade in the abatement of the major sources of pollution. These efforts which have keyed on the problems of nutrient enrichment and nuisance algal growth have produced a levelling off of net algal production across Lakes Erie and Ontario and have given rise to decreased algal production and improvements in algal species composition in portions of both lakes including Lake Erie's western basin, the Bay of Quinte and the Toronto waterfront. These successes in turn have benefitted the user through improved recreational opportunities, greater efficiency in treatment of water for domestic supply, reduced incidence of algal-related taste and odour problems in water supplies and improved fishery habitat.

Ministry surveillance programs along with programs of the other environmental and regulatory agencies around the Great lakes are constantly and rapidly adding to our knowledge of the distribution in the Great lakes environment of many familiar compounds such as mercury, PCBs and DDT as well as of many previously unidentified contaminants. Controls on the manufacture, transport, use and emission of the contaminants of most immediate concern have been implemented across the basin. While the persistence of many of these means that ecosystem recovery will be a gradual process, current information indicates sizeable reductions in body burden levels in fish and other biota.

In addition to these basin-wide achievements, the

success of Ministry pollution abatement efforts are also reflected in improvements at the local level. These include Sault Ste. Marie where reductions have occurred in phenolics and bacteria levels, the Detroit River where municipal controls have reduced bacteria levels, the Toronto waterfront where reductions in nutrient and bacterial levels in the harbour area have occurred and Belleville where a reduction in filter clogging and the incidence of taste and odour in the domestic water supply has been documented.

The following are the highlights of the Ministry's surveillance activities and findings on a lake-by-lake basis. Details of the 1980 surveillance programs can be found in the Canada-Ontario Agreement Review Board Document "Canada-Ontario Surveillance Programs 1980-81".

## St. Marys River

Activities focussed on the continued monitoring of construction activity at Great Lakes Power and on development of Control Order requirements for Algoma Steel Corporation.

Cofferdam construction and the resulting alteration to discharge rates and flow pattern had little effect on water quality and did not appear to interfere with existing waste dispersion patterns. Alert levels established by the Lake Superior Board of Control for the protection of area water uses were not exceeded.

Information on river water quality and river dispersion characteristics was used in determining effluent requirements for a new Control Order for Algoma.

## Lake Huron

Studies suggest that conditions in the nearshore zone are unchanged from the high quality reported by the Upper Lakes Reference Group in 1976. The sensitivity of Georgian Bay to nutrient inputs which promote nuisance growth of the alga, *Cladophora*, was demonstrated by Branch investigators. This had led to the recommendation of more stringent controls on phosphorus levels in municipal discharges.

## St. Clair River

An investigation in the Sarnia Bay area indicated that total and fecal coliform levels often exceeded the provincial objectives for recreational use during the summer. The violations of the objectives are attributed to discharges from storm sewers. Possible remedial action is being investigated. Three additional reports on the St. Clair organic study were completed. Based on the findings of this study, the Ministry is developing programs with industry in the Sarnia area to further reduce organic loadings to the river. Included is a new biological treatment system at Polysar.

## Detroit River

A survey of the Detroit River conducted in 1980 revealed an impaired benthic community and high levels of PCBs, mercury and some pesticides originating in the vicinity of the Detroit sewage treatment plant, Great Lakes Steel Company and the Rouge River. Nevertheless, improvements in the biological communities have occurred along both sides of the river since 1968.

Total phosphorus loadings from the Detroit River to Lake Erie have stabilized after a significant decline over a 12-year period from 1967. Further reduction is awaiting completion of treatment facilities serving metropolitan Detroit scheduled for 1981.

## Lake Erie

Reports on Lake Erie water quality conditions are under preparation summarizing findings of a two-year international study of the lake in 1978-79.

Total phosphorus levels in nearshore waters of the western basin have declined at a rate of more than three ug/L over the last decade. This improvement has contributed to a decline in algal densities and enhanced treatment efficiency at the Union municipal water plant. Significant improvement in the zoobenthic community was also demonstrated by a comparison of 1979 findings with results from an earlier survey in 1968.

The influence of the Grand River discharge on enrichment in the eastern basin of Lake Erie was assessed and found to be particularly significant during the spring when river discharge affected nutrient levels as far as Port Colborne. *Cladophora* accumulation along the north shore of the basin has decreased in recent years in response to phosphorus controls. Further phosphorus load reduction will be necessary if shoreline recreational use in the extreme eastern section of the lake is to materially benefit. Local studies in several harbour areas indicated degraded water quality at Port Stanley and Wheatley. Some improvement at Wheatley was noted to have occurred in recent years as a result of remedial measures undertaken by Omstead Foods Ltd.

## Niagara River

Surface water quality surveys were conducted along fixed ranges in the lower and upper Niagara River during 1980. Water samples were in compliance with drinking water criteria, but at some locations in the lower Niagara River, the objectives for the protection of aquatic life were occasionally exceeded for some heavy metals, several organochlorine pesticides, phenols, total coliform bacteria and total phosphorus. Concentrations of aluminum, iron, mercury, total phosphorus, nitrate and nitrite, ammonia, total Kjeldahl nitrogen, and fecal coliform bacteria exceeded objectives on the U.S. side of the

upper Niagara River (Tonawanda Channel) reflecting the numerous sources in this heavily developed area.

Biomonitoring of trace contaminants (e.g. PCBs and organochlorine pesticides) using caged freshwater clams was initiated in the Niagara River and proved successful in the identification of source areas.

## Lake Ontario

While phosphorus levels in nearshore waters of Lake Ontario have declined dramatically since they reached their peak in the late 1960s, they appear to have stabilized in the last four years. Additional phosphorus controls are being implemented in the Lake Ontario basin as they are in the Lake Erie basin and it is expected that levels will resume a downward trend. The International Joint Commission is considering a target level of 10 $\mu$g/L of total phosphorus as necessary to achieve and maintain acceptable water quality.

1980 was the final field season on Hamilton Harbour. Summary reports on the findings are being prepared. The development of statistical and block water quality models, linking loadings to the harbour with oxygen depletion is continuing. Investigations of the processes affecting oxygen levels suggest that the main sinks for oxygen are the bacterial oxidation within the water column, of organic carbon and of reduced sulphur and nitrogen compounds.

A study of the behaviour of the thermal plume from the Pickering Nuclear Generating Station during the winter months was carried out in co-operation with Ontario Hydro and the National Water Research Institute. The thermal plumes generally follow the coast and are narrow—around one km in width. Depending upon currents, temperature rise may be detected five to 10 km from the station. The easterly plumes are about twice as frequent as westerly ones.

Controls on municipal inputs of phosphorus have resulted in reduction of as much as 40 per cent in phosphorus and chlorophyll (a measure of algal biomass) levels in the upper portion of the Bay of Quinte. User benefits were evident at the Belleville water treatment plant where microstrainers used to filter out the algae were in operation for only a few weeks in 1980 in contrast to the 4-5 month/year operation needed in earlier years. Lower algal biomass and changing species composition have also led to a marked decrease in the incidence of taste and odour problems in the treated water.

Dissolved oxygen concentrations continued to be low (1-2 mg/L) in the Adolphus Reach outlet of the Bay of Quinte during the late summer (August). No change has been observed in the oxygen status in that region since the late 1960s when observations began. It would appear that phosphorus abatement measures thus far have had little impact on the oxygen regime in this area and that oxygen concentrations are influenced by the deepness of the channel. Dissolved oxygen concentrations in the bottom waters of the Eastern Basin of Lake Ontario were also low in late August in the area south of Amherst Island as far as Pigeon Island. Surface waters in the area were however well above the six mg/L objective set out for the protection of aquatic life.

## Toronto Waterfront

Data collected during recent years indicate that swimming beaches on the Toronto waterfront are in compliance with the Provincial Objectives for the protection of body contact recreation areas. Several areas along the waterfront nevertheless exceed the bacteriological objectives. These areas are largely confined to locations receiving sewage treatment plant discharges and storm and combined sewer overflows. A declining trend in coliform densities has been noted in these areas over the last few years reflecting improvements made to the sewer system, the construction of the new York-Durham sewage network and treatment plant and the elimination of several sewage treatment plants previously discharging to the Don River. One of the remaining non-compliance areas is Ashbridges Bay which receives both storm overflows as well as main sewage treatment plan seagate discharges. An inter-agency study is underway in an attempt to define the relative significance of these inputs into the area and to assess the effectiveness of several remedial measures including a new main sewage treatment plant outfall.

Total phosphorus concentrations in the inner and outer harbours continue to exceed the provincial guideline of 20 $\mu$g/L for the protection of Great Lakes waters. In spite of these high phosphorus levels, total algal biomass, as reflected by chlorophyll *a* measurements, has not reached nuisance proportions in the harbour areas. The absence of algal blooms can be accounted for by elevated harbour and nearshore turbidity levels which limit the available light.

Several of the provincial guidelines for open water dredged spoils disposal are exceeded in the sediment quality throughout the waterfront area. Among these are PCB's, mercury, lead and organic content. Heaviest contamination is found in the Keating Channel at the mouth of the Don River, in the Inner Harbour boat slips and in portions of Humber Bay. Contaminated spoils are disposed of in a confined basin on the outer face of the Eastern Headland.

An intensive study was conducted in 1980 to determine the effects of dredge spoil disposal from Toronto Harbour at Keating Channel and landfilling at the Headland on the water quality in the Toronto waterfront. The data suggest that the dredge disposal and landfill construction activities at the Eastern Headland have not adversely affected water quality in the nearby areas. Turbidity plumes recorded east of the Headland appear to originate from active landfill activity and erosion processes acting on the existing landform. The observed turbidity levels did not, however, reach levels of concern to either the Island or R.C. Harris drinking water supplies or to aquatic life.

## St. Lawrence River

Investigations of bacterial contamination in and downstream of the Cornwall area led to recommendations on improvements to the municipal sewage collection system and expansion of the sewage treatment plant at Cornwall. The necessary works are tentatively scheduled for completion by 1985.

Investigations of PCB sources across the river in Massena, New York by the New York Department of Environmental Conservation confirmed the 1979 findings of the Ministry. Remedial action has been initiated at the three local industrial plants to reduce or eliminate the PCB emissions.

## Basin Wide Activities

The Branch continued to provide support to International Joint Commission activities under the Great Lakes Water Quality Agreement of 1978 as well as providing information on water quality trends, on areas where water quality did not meet Agreement objectives, on emerging problems and on waste inputs. Branch staff served on several committees involved with the planning of and reporting on international surveillance activities and on the formulation and review of water quality objectives.

A major advancement in developing closer links between waste inputs and their water quality impacts was made during 1980 with the application of predictive modelling to the determination of mixing zones for new expanded waste discharges. This approach was used in determining appropriate outfall location, outfall design and effluent requirements for municipal and industrial treatment facilities at Sault Ste. Marie, Gore Bay, Sarnia, Wheatley, Pt. Burwell and Cornwall. Estimation of mixing zones for many existing discharges were also developed for later verification with actual field measurements.

Young-of-the-year spottail shiners continued to be useful indications of tributary source areas and trends in input levels of persistent organic substances. Since sampling began in 1975 fish from all nine monitoring locations in Lakes Erie and Ontario have shown declines in body levels of PCB and DDT.

# Pollution Control Branch

Director: K.E. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated policy legislation, regulations and guidelines to control the emission of contaminants and the quality of drinking water. Other functions include applied research, technology transfer, technical advisory services and delivery of certain aspects of the pesticides and noise control programs.

## Municipal and Private

The Municipal and Private Section has responsibility for controls governing communal water supplies and municipal and private wastewater treatment systems. To this end, staff assess the effectiveness of existing programs and review the need for policy revision or the development of new policies.

Activities included administering a $52 million federal grants program provided to assist in the construction of municipal water and sewage services under the Community Services Contribution Program, since terminated by the Federal Government. Continued co-ordination of this program within the Ministry and liaison with the federal government and other participating provincial ministries, was provided.

Draft policy and guideline statements were prepared governing the use of marshlands for the upgrading of sewage works effluents, the management of urban drainage and the dewatering and stabilization requirements of municipal sewage sludge prior to its utilization and disposal. Interim guidelines for compost quality, production and end-use were also prepared.

Monitoring and evaluation of phosphorus removal at wastewater treatment plants was continued and assistance was provided to Ministry staff in implementing the program. In 1980, 222 wastewater treatment plants with phosphorus removal facilities removed an estimated 7000 tonnes of phosphorus which would otherwise have been discharged to our lakes and rivers.

A status report on the pollution abatement efforts of Great Lakes municipalities was forwarded to the International Joint Commissions (I.J.C.) for inclusion in the I.J.C. Water Quality Board Annual Report.

Implementation of the Guidelines for Utilization of Sewage Sludge on Agricultural Lands successfully moved into the second year of its three-year phase-in period. Municipalities are now spreading acceptable sludges in accordance with the Guidelines provisions, while unacceptable sludges are temporarily being spread at reduced rates. Corrective measures, brought into effect by municipalities, will ensure maximum

agricultural utilization of sludges with minimum risk to health, the environment and crop production. Implementation of the program is being co-ordinated jointly by the Ministry of Agriculture and Food and the Ministry of the Environment

Seven notices were prepared and distributed to those responsible for administering the private sewage program under Part VII of the Environmental Protection Act. These notices are intended to keep the Ministry of Health, Health Unit and Ministry personnel up-to-date regarding technical, financial and legal aspects governing private sewage systems.

In excess of 40 firms were certified during the year to manufacture septic tanks and sewage holding tanks. Certification is required by Regulation.

Drafting of the Revised Ontario Drinking Water Objectives was largely completed. The Ministry of Health, the Ministry of Labour, the Ontario Municipal Water Association, the American Water Works Association (Ontario Section) and The Municipal Engineers Association participated in the preparation of the document.

The Revised Chlorination Bulletin was distributed to water works managers, treatment plant personnel, Medical Officers of Health, Ministry field staff and consulting engineers. About 2,500 copies were distributed.

A proposed Ozonation Standard was prepared for the Ten States Standards Water Committee for inclusion in the forthcoming revision of the Ten State Standards for Water Treatment.

## Noise Pollution Control

Seventy municipalities have now adopted a noise control bylaw under Section 95a of the Environmental Protection Act for the control of nuisance noises in their communities. Of these, three have adopted the comprehensive bylaw while 62 have adopted a simpler format and four rural areas have adopted a special purpose bylaw designed to control animal noise in the community.

Two noise prosecutions were launched under Section 14 (1) of the Act by external groups and Provincial Officers were called upon to provide expert testimony in one of the actions.

The draft Official Plans for Mississauga and Brampton in the Region of Peel were reviewed. A major concern in these communities is the impact of aircraft noise on residents. The City of Mississauga and the Ministry also co-operated in resolving several other land use issues:

- Planning for the new Highway 403 noise barriers;
- Analysis of noise impacts of planned CN Bramport Intermodal Terminal;
- Joint study with CN Rail into rail noise impacts on housing located to the south of the new Bramport Terminal;
- Analysis of noise impacts resulting from operations at Reid Milling Limited in Streetsville.

Three situations involving complaints made to Ministry and to the Ombudsman were investigated.

The Section continued to provide technical comment on new land use proposals and new industrial and commercial projects as provided for under the legislation. More than 2,500 projects have been assessed for noise impacts since the Ministry was reorganized in 1974.

The Ministry has conducted the final series of noise control training courses under the original format. Over 800 trainee-weeks of instruction have been provided since 1975 to provincial and municipal employees and to the private sector. The Canadian Acoustical Association has agreed to co-sponsor future noise control training courses designed to accommodate changing needs.

## Pesticides Control

During 1980-81, the Pesticides Control Section held 2,221 examinations and issued 6,880 exterminator, 1,028 operator, and 3,664 vendor licences. The Section also issued 190 permits for the use of restricted products on land, 477 permits for the application of pesticides to water, and 194 permits for structural extermination.

Under the termite control program, new infestations were discovered near Malden Centre, Colchester and Lakeview Beach, in Essex County, and in Elmira and Oakville. Termite control agreements were established with the Town of Dresden and the Borough of York.

The following is a list of municipalities with which agreements have been concluded and of grants approved for chemical treatments and structural alterations required for the control of termites:

| MUNICIPALITIES | GRANTS |
|---|---|
| City of Toronto | 247 |
| Borough of York | 8 |
| Borough of East York | 48 |
| City of North York | 1 |
| Borough of Scarborough | 24 |
| Village of Elora | 15 |
| Town of Markham | 1 |
| Town of Fergus | 1 |
| Town of Leamington | 88 |
| Town of Kincardine | 22 |
| Borough of Etobicoke | 6 |

Altogether 461 treatments were carried out for which grants totalled $250,000.

## Contingency Planning

The Contingency Planning Section updated and reprinted the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials. The contingency plan organizes the activities of various provincial and federal government agencies, which may be involved in the response to spill incidents of major proportions in the event that the response by the party responsible for the spill is inadequate.

During 1980-81, the section received spill reports on 552 incidents. Of these, 324 involved the loss of oil, 84 involved the loss of liquid and solid hazardous materials; 18 gaseous materials and 96 other environmental contaminants.

## Research and Development

The Co-ordination and Technology Transfer Section is responsible for internal and external research co-ordination and liaison and for administration of the research facility.

The Supervisor is Chairman of the Ministry's Research Advisory Committee, which is responsible for the co-ordination of research and development throughout the Ministry. The Committee also administers the Provincial Lottery Fund. During this year, 27 health-related environmental projects were funded at a cost of $1.8 million.

Project subjects included removal of organic contaminants from drinking water, effects of air pollutants on children's health, atmospheric deposition of mercury and nutagenic activity of PAHs.

During the year, liaison was maintained with the United States Environmental Protection Agency, particularly, its drinking and wastewater research groups in Cincinnati, Ohio, and with Ministry counterparts in the Federal Government.

## Applied Sciences

The Applied Sciences Section is an engineering group, which carries out and reports on studies of innovative concepts relating primarily to municipal servicing for Northern communities and private waste systems for non-sewered development.

During 1980-81 two reports were prepared on the basis of studies of groundwater in and near tile beds.

Section staff have provided an increasing amount of technical advice and field service to commercial establishments and resorts on the design, approval and construction of large subsurface sewage disposal systems and to both the public and private sectors on the design and construction of pipelines.

## Wastewater Treatment

The work of the Wastewater Treatment Section is directed towards advancing the quality of treatment and control of urban wastewater discharges and providing technical support and expertise in the formulation of related guidelines, policies and programs.

The section maintains an analytical laboratory for special analyses and the Ontario Experimental Facility, a 5.0 MIGD activated sludge plant, for use in developmental research work and operator training.

At year-end, the section was involved in a total of seven research projects.

Staff also provided advice to some 21 municipalities throughout the province on various aspects of wastewater treatment. Assistance was provided to 18 industries on specific waste treatment problems.

Section staff also participated in the development of several policies including those relating to urban drainage control, combined sewer overflows, effluent disinfection, sludge composting, and minimum sewage treatment requirements.

## Water Technology

The Water Technology Section conducted research concerning oxone, trace organics (including trihalomethanes (haloforms), trace contaminants in water treatment chemicals, iron and manganese treatment, asbestos, the effect of treatment processes on treated water quality, distribution systems, and macro/micro-biological water quality.

Staff provided technical consultation on new water supply treatability studies, raw water plant commissioning, plant up-rating and plant operational and technical problems, including the advanced treatment necessary for trace contaminant control or removal.

# Environmental Approvals Branch

Director: T.W. Cross

The Environmental Approvals Branch provides an approvals function for companies, individuals and government agencies requiring approval for their projects under the Environmental Assessment Act and sections of the Environmental Protection Act and Ontario Water Resources Act.

## Municipal & Private Approvals

The Water & Wastewater Approvals Unit reviews applications for approval for water and sewage works under Section 41 and 42 of the O.W.R. Act.

**APPLICATIONS FOR APPROVAL FOR WATER AND SEWAGE WORKS**

| Municipal & Private Applications Received | | Provincial Applications Received | |
|---|---|---|---|
| **Water** | **Sewage** | **Water** | **Sewage** |
| 916 | 1432 | 41 | 74 |
| **Applications Approved** | | **Applications Approved** | |
| **Water** | **Sewage** | **Water** | **Sewage** |
| 940* | 1473* | 43* | 77* |
| **Applications Cancelled** | | **Applications Cancelled** | |
| 72 | | 0 | |

*Applications carried over from 1980.

| Total Cost of Applications Approved | Total Cost of Applications Approved |
|---|---|
| **Water** $28,440,505.60 | **Water** $195,985,274.03 |
| **Sewage** $95,041,275.00 | **Sewage** $378,992,725.06 |
| **Total Cost of Water and Sewage** | **Total Cost of Water and Sewage** |
| **$123,481,780.60** | **$574,977,999.09** |

The processing of these applications is aided by the Ministry's transfer program for technical review which has been favourably accepted by the Regional Municipalities and is intended to be extended to others. Under this program, municipal engineering staff review routine water and wastewater applications against MOE guidelines and make recommendations directly to the Director of the Environmental Approvals Branch.

In 1980-81 the program was extended to include the City of Chatham.

The Waste Management Approvals Unit administers Part V, Section 33 of the Environmental Protection Act for the approval of waste disposal sites and waste management systems.

In 1980-81 the Unit re-issued approximately 840 applications for waste disposal sites and 504 applications for waste management systems.

There is still a trend to replace smaller inadequate sites for larger regional ones. The unit received 17 new applications for waste disposal sites of which 13 were issued certificates of approval. During the 1980-81 fiscal year 15 sites were entered for hearings; seven proceeded to the Environmental Assessment Board. In the same period three appeals were requested, two of which were withdrawn. At year-end 1,547 active waste disposal sites were licensed by this Ministry.

The Unit issued 373 licenses for septic tank haulers and 91 for waste haulers. As of March 31, 1981, 3,483 licenses for septic tank haulers and installers had been issued.

## Industrial Approvals

The Industrial Approvals Section processes industrial applications for approval of treatment and control facilities for contaminant discharges into the natural environment.

It also provides technical expertise and advice on industrial pollution control technology to branch and regional staff, industry and Regulatory Agencies of other provinces.

Applications received and processed in 1980-81 are summarized below:

**APPLICATIONS PROCESSED**
From April 1, 1980 To March 31, 1981

| | Received | Approved | Cancelled | Denied |
|---|---|---|---|---|
| **Air** | 1063 | 969 | 89 | 5 |
| **Water** | 103 | 75 | 18 | 0 |
| **Waste** | 23 | 26 | 11 | 0 |
| **Total** | 1189 | 1070 | 118 | 5 |

"Applications received" show an increase of 15 per cent over the previous year.

Staff provided input on the implementation of the sulphur dioxide alert system in the Sarnia area during a large upsurge in industrial expansion. Plans have been finalized and construction started on projects totalling $1.8 billion over the next three to five years.

## Environmental Assessment

The Environmental Assessment Section is responsible for administering the Environmental Assessment Act, which provides for a decision to approve or not approve an undertaking which is subject to the Act, based upon an examination of the environmental effects of the undertaking and alternatives.

During the year, the Section continued to review formal environmental assessment submissions of Provincial Ministries and Government Agencies, including the Conservation Authorities. On June 3, 1980, the Act was extended to the Municipal Sector to take effect in January 1982. Section staff carried out more than 40 information sessions for Municipal representatives on the Environmental Assessment Act at various locations across the Province. A major seminar was held with a large cross section of Municipal representatives in February, 1981. In addition, the Section is continuing its analysis of applying the Act to the private sector.

As some undertakings might be subject to more than one hearing before more than one board under such acts as the Environmental Assessment Act, the Environmental Protection Act, the Planning Act, the Expropriation Act, the section prepared a Bill for the general "streamlining" of government approvals processes.

During the year, 22 reviews were completed and published on undertakings for which environmental assessments were submitted. Twelve undertakings were given approval to proceed, subject to conditions. In all of these cases, the initial assessment and review process resolved all areas of concern so that public hearings were neither requested nor required. Twenty formal submissions, six resubmissions and nine draft submissions were received on undertakings for approval under the Environmental Assessment Act.

Four undertakings were referred to the Environmental Assessment Board for public hearings, at the request of the public and the first two hearings of the Board under the Environmental Assessment Act were completed.

## Land Use Co-ordination

The Land Use Co-ordination Section advises other government agencies at all levels and the private sector on environmental matters related to land use planning. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans and other proposed land use changes to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use, including the development of Ministry policies on land use.

In 1980-81 the Section provided advice and assistance to the regional municipalities in the Toronto centred region in the implementation of their offical plans. It also reviewed 28 documents submitted under the Environmental Assessment Act. Studies were carried out on: remote sensing, monitoring the effectiveness of the plan review program; buffers and land use compatibility, wetlands policy.

The Section co-ordinated the Ministry's appearance at the Ontario Municipal Board hearing regarding the 3 km buffer around major industry in the Region of Haldimand-Norfolk.

Staff assisted the Niagara Escarpment Commission Staff and the hearing officers at public hearings on the proposed plan for the Niagara Escarpment as well as representing the Ministry on a variety of other committees and task forces.

Forty exemptions were granted under Section 30 of the Environmental Assessment Act during the year.

Staff pre-consulted on approximately 20 projects with Provincial Ministries and Agencies.

Section staff continued to hold seminars and lectures on the Environmental Assessment Act and in particular co-ordinated a course on witness training for staff participants involved in hearings under the Environmental Assessment Act.

# Project Co-ordination Branch

Director: J.C.F. MacDonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating and reviewing all Ministry capital sewage and water projects from inception to the completion of construction.

During 1980-81, the branch handled 211 construction contracts and administered a capital expenditure of approximately $123.6 million. Of this amount, 36.9 per cent was paid out as subsidies under the Ministry's construction program for municipalities. In addition, the branch is responsible for the administration and budgeting of the Ministry's:

- direct grant program for providing grants to assist the construction of municipally-owned water and sewage facilities (1980-81 expenditure $33.2 million);
- grant program to assist the construction of major water and sewage works in regional and restructured municipalities (1980-81 expenditure $8.2 million);
- grant program for low-cost alternatives to communal systems in small communities (1980-81 expenditure $3.2 million).

## Project Management

The Project Management Section is responsible for the development and management of the Ministry's capital works program within the Ministry's six regions, excluding the York-Durham area scheme. The Section administers the Ministry's Direct Grant Programs, including the development of budgets and the managing of cash flow, and provides project management services, when requested, on certain direct grant projects for small municipalities lacking resources or expertise for handling their own sewage or water works projects. The Section is frequently the delivery arm for other Ministries such as Northern Affairs, Treasury and Economics, Industry and Tourism, Housing and Intergovernmental Affairs in implementing sewage and water programs, particularly where such programs are carried out as provincial priorities.

Since March 1979, the Section has administered the expenditures under the Community Services Contribution Program (CSCP), which replaced the former Canada Mortgage and Housing Corporation (CMHC) infrastructure assistance program. CSCP grants totalling $51.6 million, including $30.1 million for Ministry-financed projects, were committed for payment in 1981-82 (see appendices). In December 1980, the Federal Government announced the termination of the CSCP.

Projects in Northern Ontario continued to receive financial assistance from the Ministry of Northern Affairs to accelerate infrastructure development. Approximately $4 million was provided by Northern Affairs for direct administration by the Branch in assisting 35 such projects.

Close liaison continued with the Ministry of Northern Affairs to assist in the development of that Ministry's programs in future years and the Ministry of the Environment's programs for sewage works and water works.

Two subsidy agreements under the General Development Agreement of the DREE/RPB (Department of Regional Economic Expansion/Regional Priority Budget) programs continued to be administered by management committees, which include representatives from DREE, the Ministry of Northern Affairs and the Ministry of Intergovernmental Affairs and the Branch's project manager for the particular region. The Northwestern Management Committee administers a $50.8 million program that includes sewage improvements in Thunder Bay and Ignace. The Northeastern Management Committee administers a $30.0 million program that includes services for industrial parks in Parry Sound, Sudbury and North Bay, as well as infrastructure in Timmins. The DREE/RPB program also included expenditures for infrastructure projects for single industry resource communities such as Nakina, Longlac, Geraldton, White River and Hornepayne.

Projects funded jointly by the Ministries of Northern Affairs and Environment have proven to be effective not only in terms of the MOE's objectives, such as pollution control, but also as a means of implementing the broader provincial objectives of improving the infrastructure necessary for growth and development.

In the West Central Region, construction continued on the Haldimand-Norfolk Provincial Area Water Supply System. The trunk watermain to the new community of Townsend was completed on schedule to meet the Ministry of Housing's requirement for water supply by September 1980.

In the Central Region, design and construction continued on the $40 million sewage works and water works program for the community of Keswick in the Township of Georgina. By the end of March 1981, seven contracts with a total value of about $9.2 million had been awarded.

Construction continued on the $16 million Wasaga Beach sewage works and water works program with funding provided through the Ministry of Natural Resources. The $3.1 million sewage treatment plant was completed in November 1980.

## York-Durham Projects

In April/May 1980, five existing sewage treatment plants were taken out of operation and flows were directed to the new plant at Duffin Creek.

Additional facilities were added to the York Water System in Woodbridge and Markham and design and construction commenced on the remaining pipelines in these two areas and in Richmond Hill.

During the fiscal year 1980-81 over $27 million was spent on the sewage system and about $5 million on the water system.

## Design and Equipment Review

The Design and Equipment Section reviews and evaluates for approval purposes, design submissions received from consulting engineers for all sewage and water projects where contracts are to be awarded or managed by the Ministry. The submissions are evaluated from the viewpoints of sanitary, mechanical and electrical engineering and cost effectiveness, including energy utilization and conservation.

The Section processed approximately 149 submissions including major sewage and water projects in South Peel Region, York-Durham Area and Haldimand-Norfolk Region. In addition, the Section was involved in the preparation of design guidelines and standard specifications for equipment.

## Ground Water Development

The Ground Water Development Section supervised four test drilling and two well construction contracts with a total value of $129,000. The Section also undertook two formal ground-water surveys and numerous special investigations involving well testing and analysis of well and aquifer performance for Ministry projects. The Section was also extensively involved in the investigation and resolution of well water interference complaints arising from contractors' dewatering activities in four water and sewage construction programs. In addition, the Section reviewed reports on low cost alternative proposal schemes and on proposals, engineering drawings, hydrogeologic reports, involving well-water programs and ground-water problems.

## Project Control

The Project Control Section co-ordinates the compilation of data and the preparation of schedules relating to anticipated expenditures and cash flow for Ministry sewage and water works programs. The Section monitors and records commitments and expenditures and advises on the scheduling of contracts to meet budgetary requirements. Various statistics on costs are compiled as required.

(See Tables 1 and 2 at the end of this section and Graphs I to IV in appendices).

## Claims and Contracts

The Claims and Contracts Section handles disputed claims for payment made by contractors, third parties etc. in relation to projects financed or managed by the Ministry and assists in arbitration or litigation arising from such claims. The Section investigates technical and contractual bases for claims and reviews matters with consulting engineers and expert witnesses.

The Section receives tenders, reports on tenderers' financial statements to senior management, carries out documentation related to the awarding of contracts and arranges for the execution of agreements.

The Section receives Notice of Claim under the Mechanics' Lien Act, maintains a Register of Claims, provides the basis for the Crown's defence in any Mechanics' Lien trial and assists in the resolution of lien claims whenever possible.

During 1980-81 there were nine disputes in active litigation, two in arbitration and approximately a dozen others were dealt with at an administrative level.

## Special Activities

The Special Activities Unit provides special inspection of construction, investigation of unusual construction problems, administration of the Ministry's prequalification system for concrete sewer pipe plants, representation on committees involving standardization, metrication and co-ordination and other administrative and support activities.

The Unit carried out approximately 90 field inspections of Ministry sewer and water works projects during the year. These inspections were principally at substantial completion but included inspections during construction and at the end of the one year's period of maintenance. In addition, approximately 20 man-days were spent on the investigation and resolution of special construction problems.

The Construction Inspectors' Courses (Nos. 1 and 2), sponsored jointly by the Ministry and the

Municipal Engineers' Association, were again held. Approximately 55 candidates from municipalities and consulting engineering companies attended each of the one week courses.

Staff spent considerable time through the year on the review and drafting of standards and specifications and in the evaluation of new products proposed for incorporation into Ministry works.

## Field Services

The Field Services Section includes specialists in mechanical and instrumentation equipment fields and provides technical advice and skills with respect to new and operational sewage and water works installations. These activities cover the design, construction and maintenance phases of Ministry projects.

In addition, the Section provides emergency service as required and carries out maintenance audit inspections of operational plants.

About 67 per cent of staff time was spent on the capital works program and 33 per cent on operational installations.

**TABLE I**

**PROJECT CO-ORDINATION BRANCH**

**Volume of activity under Capital Construction Program during 1980-81.**

| | | |
|---|---|---|
| 1. | **Capital Expenditure** | $123,646,506 |
| | Sewage Works | 101,910,586 |
| | Water Works | 21,735,920 |
| | Provincial Projects | 121,737,675 |
| | Municipal Projects | 1,908,831 |
| | Provincial Subsidy | 45,617,086 |
| | % of total expenditure | 36.9% |
| 2. | **Construction—Ministry Projects** | |
| | Contracts Tendered — No. | 104 |
| | Value | $110,163,935 |
| | Contracts Started — No. | 97 |
| | Value | $100,936,987 |
| | Contracts Completed — No. | 113 |
| | Value | $114,257,000 |
| | Contracts Under Construction During the Year | 219 |
| | Average Number of Contracts Under Construction in each month | 106 |
| 3. | **Construction—Project Management (Direct Grant)** | |
| | Contracts Tendered — No. | 7 |
| | Value | $ 3,898,595 |
| | Contracts Started — No. | 7 |
| | Value | $ 3,898,595 |

**TABLE II**

**PROJECT CO-ORDINATION BRANCH**

**Grants to municipalities for sewage works and water works during 1980-81.**

| | | | | |
|---|---|---|---|---|
| 1. | MBR priority evaluations | | | |
| | (1) Direct Grant Program requests | 37 | | |
| | Ruled eligible | 24 | | |
| | Rejected | 13 | | Total |
| | (2) Private Systems Program requests | 32 | | evaluated |
| | Ruled eligible | 25 | | 69 |
| | Rejected | 7 | | |
| 2. | Direct Grant Program payments (15% to 75% grants) | | | $33,189,946 |
| 3. | Private Systems Grant Program payments (75% grants) | | | $ 3,247,786 |
| 4. | Grants to Regional and Restructured municipalities (15% grants) | | | $ 8,200,000 |
| 5. | Federal CSCP Grant commitments for payment in 1981-82 (administered by MOE) | | | $51,600,000 |

# Waste Management Branch

Director: C.J. Macfarlane

## Experimental Plant for Resource Recovery

The transfer station section of the plant was in full operation on 127 of the 251 operating days this year. A total of 124 days of production were lost, 69 days due to a strike by employees of Browning-Ferris Industries, the contract operator, and 55 days due to major damage and repairs to the receiving floor. Modifications were made to conveyors and compactors during the period of floor repairs to reduce operating downtime from recurring mechanical problems resulting from the handling of commercial-industrial wastes.

The resource recovery facilities were in routine operation on 113 of the 251 operating days. Downtime resulted from the strike previously noted; in addition, 61 days were lost because of the damage and repairs to the receiving floor, one day of scheduled downtime for repairs and seven days of unscheduled downtime due to equipment problems and repairs. Modifications were made during the period of the receiving floor repairs. A significant improvement was evident when plant operations resumed in March 1981.

The production goal of 200 tonnes per day was achieved or exceeded on 23 days during the year. A new production maximum of 263 tonnes was established.

The composting facilities were processing to the system's design throughout and producing a saleable product.

The installation of a burner to remove contaminants from the ferrous product was completed in September 1980. The unit is effective in improving the product appearance, a key factor in its marketability.

The Experimental Plant continues to be a source of information for government officials, consultants, schools, and the general public interested in resource recovery as a solid waste management alternative. Guided plant tours were conducted for 784 visitors during the year.

## Marketing and Development

During the year a total of 935 tonnes of ferrous metal was sold. The major consumer was LASCO (Lake Ontario Steel Co.), buying 822 tonnes in its "shredded" or as-is form from the plant. Some ferrous metal was further processed into densified bales and sold to both General Motors (102 tonnes) and Brown & Boggs Foundry and Machine Co. (11 tonnes). Ferrous usage also was demonstrated in several other small iron foundries.

Although the major market development for the light fraction or refuse-derived fuel (RDF) from the plant is the cement industry, as a source of energy, other potential uses are being investigated.

The Brampton Brick Co., with Ministry funding, is investigating the addition of the mulched light fraction to their brick mixture as a burn out fuel in clay brick manufacture and secondly as a major ingredient of fire logs where the light fraction would replace wood chips. Some light fraction was further shredded into a finer material called "mulch" for use as a component part of the "hydro seeding" process. Several other companies have also been asked to evaluate this product.

There was a test burn of the RDF at Canada Cement La Farge in Woodstock from April 7 to April 25, 1980. Most of this firing was carried out at a substitution rate of 18% of the kiln energy requirement. A short run of 27% RDF substitution was also conducted. The cement quality during the burn was acceptable.

The Branch has both sold and provided compost from the plant for demonstration and/or evaluation to over 10 other potential users. The on-going marketing activities of the Resource Recovery Unit are geared toward the maximization of material and/or energy recovery from solid waste. This should enhance the concept of total recycling as far as the public is concerned and guide municipalities with their waste management recycling policies. Specific projects of material/energy recovery are designed to establish the usefulness and price of such products in a supply/demand marketplace.

## Source Separation

Project Paper Recycling is in its second year of operation. During the first year, 217 tonnes were sold and the second year will probably yield slightly more.

Seventeen government buildings in Metro Toronto and approximately 8,000 employees were involved in recovering fine office paper. The program will be extended.

Project Paper Recycle had a gross revenue of $25,000 for the first year and removed from the solid waste stream 217 tonnes of paper all of which will be recycled back into useable bond paper.

## Waste Management Studies

Three studies initiated previously were still underway in the fiscal year 1980-81 in the District Municipality of Muskoka (pop. 36,748), the North

Shore Township of the District of Algoma (pop. 1989), and the Towns of Midland and Penetanguishene and the Townships of Tay and Tiny in the County of Simcoe (pop. 30,160). One study was initiated early in the fiscal year 1980-81 for the Regional Municipality of Haldimand-Norfolk (pop. 87,544).

A 20 year waste management master plan for Metropolitan Toronto was completed using a computer model developed for the Ministry. The plan was accepted by Metro and is being used to determine such things as the dates for phasing out obsolete facilities and bringing new facilities onstream.

## The Waste Management Improvement Program

In 1980-81 there were 118 contracts with municipalities to upgrade their waste disposal sites for a total cost of $459,000.

## Site Identification Study

In 1980, the Ministry contracted with York University, Lakehead University, and Laurentian University, to identify abandoned waste disposal sites. Graduate research students researching archives, etc. identified approximately 1450 sites. Of these, 197 were selected for further study on the basis of proximity to development and waste type.

Consultants were hired to investigate the 197 sites scattered throughout six regions. Their studies continued through early 1981. Municipalities were notified of their responsibility for remedial action. Long term monitoring will also take place.

## Greenhouse Heating Study

The St. Thomas heating study was continued for a second year by Conestoga-Rovers of Waterloo. It was co-funded by the Ministry and Environment Canada for $36,000 and $12,000 respectively. Primarily, the study is looking at the long term feasibility of heating a greenhouse with landfill generated methane gas.

## Disposal of Liquid Wastes

The Province has established the Ontario Waste Management Corporation to address the major problem of liquid industrial and hazardous waste treatment and disposal.

The Corporation is responsible for the development, including location, management, and operation of such treatment facilities. Public hearings will be held by a special hearing panel to determine the safety and suitability of the proposed site for this works, and will also be required for the facility.

The Ministry's role in the management of these wastes is to provide complete generator to disposal monitoring as well as an enforcement system. Some of the efforts being undertaken in establishing such a system include:

1) Preparation of a regulation covering generators of liquid industrial and hazardous wastes, including responsibilities for waste registration, waybill compliance, and knowledge of ultimate disposal practices;
2) Revision of the present Regulation 926 to increase generator and carrier responsibilities and provide increased monitoring of the movement and disposal of these wastes;
3) Preparation of vehicle standards and driver training requirements for carriers of liquid industrial and hazardous wastes, developed in conjunction with present legislative efforts in the transporatation of dangerous goods area; and,
4) Provision of a technique for assessing proper disposal options for liquid industrial and hazardous wastes.

## Transfers of Liquid Industrial Wastes

The waybill system of monitoring the movement and disposal of liquid industrial wastes was automated with the program meeting expectations. However, because of the significant additional demands resulting from the program of generator registration, inclusion of hazardous solid waste, and increased information demands of the waybill monitoring system, development work is being carried out on a data processing system of increased scope and capability.

## Radioactivity

Staff continued to work on effluent guidelines and low-level radioactive waste disposal.

Investigations were conducted on the leachability of certain low-level radioactive wastes to determine the best means of their disposal.

In addition, unusual levels of radioactivity contamination at Port Hope were investigated.

## PCB Handling and Disposal

The Waste Management Branch has been studying methods of efficiently destroying PCBs in an environmentally acceptable manner. The Branch has produced a draft regulation designating PCBs as a waste material and permitting owners of such material who comply with certain pre-conditions to establish storage sites for the wastes on their own property.

Monitoring briefs have been maintained on several independent ventures into PCB destruction processes. These include the use of a diesel engine (D & D, Smithville), chemical processes (Goodyear, Sunohio, Rockwell, etc.) and other innovative techniques (Pyro-Magnetics).

# regional operations and laboratories division

Assistant Deputy Minister: W. Bidell

*The Regional Operations and Laboratories Division provides a wide range of services including: environmental protection, abatement programs and complaint investigations; environmental assessment; and the operation and management by Ministry staff of water and sewage works systems constructed by the Ministry.*

*In addition, the Division provides analytical and research support to the Ministry through the operation of provincial and regional environmental laboratories.*

## Northwestern Region

Director: R.M. Gotts

### Industrial Abatement

Four Control Orders were issued in 1980-81, requiring water pollution abatement with three also requiring air emission abatement.

The companies concerned anticipate spending approximately $50 million in the completion of these Control Orders.

During 1980-81, Regional staff investigated 25 spills and 155 complaints.

Routine inspections dealt primarily with the pulp and paper industry, the mining industry and audits of effluents and emissions from other industries in the Region.

In 1980-81, Environment Canada supplied a mobile toxicity testing laboratory to the Region and extensive toxicity tests were carried out on effluent samples from all the pulp and paper companies and operating mines plus selective industries. Results of these studies will lead to new requirements in the Control Orders now being prepared and will indicate if improvements have been achieved. The survey will be continued in 1981-82.

In October 1980, Region staff dealt with a transformer malfunction at a public school in the City of Thunder Bay, which resulted in a spill of PCBs in the immediate area where the transformer was housed. Staff supervised the clean-up procedure by Thunder Bay Hydro and undertook extensive monitoring of ambient air and soil, and air within the classrooms of the school. Approximately 350 drums of contaminated soil were removed from the site.

Control Orders, which have been served or are being served on all the pulp and paper industries in the Region, will significantly improve both air and water quality during the next five years. These locations will include Marathon, Red Rock, Terrace Bay, Dryden, Fort Frances, Kenora and Thunder Bay.

The program, now completed, on the grain elevators in the City of Thunder Bay has resulted in significant improvement in ambient air quality. Fifty to 70 per cent reduction in dustfall and suspended

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particulate has been documented the past year through Ministry monitoring networks.

## Municipal and Private Abatement

Seven major water and/or sewage projects were completed in the Northwestern Region in 1980-81 (see appendices).

Regional staff dealt with four communities under the Private Systems Grants Program. All of the projects dealt with the planning or provision of water systems.

One municipal waste site, Schreiber, and approximately 10 Ministry of Natural Resources (MNR) sites were closed. The municipal site was almost filled and operational problems were being experienced. The municipality combined with an adjacent municipality to develop one site to serve both. The MNR sites were closed, either due to being filled or because other sites were available.

Many waste management sites were improved as a result of the Provincial Waste Management Assistance Fund program. Eight municipalities had major improvements made to their waste management facilities.

A new waste management site was opened at Savant Lake. In addition, 10 new MNR sites were opened or relocated in unorganized areas.

A number of waste management studies were completed in the Region. These included major studies undertaken at Marathon, Manitouwadge and Thunder Bay, primarily to investigate leachate migration in the area and at Balmertown/Red Lake, and the Dryden sites for the establishment of new sites.

Although the Municipal and Private Abatement Unit does not regularly investigate wells, 12 investigations resulted from requests by the Health Units or individuals. In most cases, these investigations related to possible oil or other chemical contamination.

Thirteen marinas and approximately 40 boats, including three houseboats, were inspected. No violations were noted by staff.

Cottages were surveyed on three lakes in the Thunder Bay District under the Cottage Pollution Control Program.

A study was completed and a report prepared on the disposal practices for pathological wastes in the District of Kenora. Every hospital and veterinary clinic was visited as well as medical and dental clinics in the district. A report was submitted to a Head Office committee that was studying this subject to prepare a policy paper on the matter for the Province.

A significant improvement was noted in the drinking water quality at Nakina as a result of

government water and sewage programs in the Township.

In addition, a significant improvement is expected in the water quality of the Atikokan River as a result of the completion of the Atikokan sewage treatment plant where phosphorus removal is practiced.

## Utility Operations

In 1980-81, the Region operated 13 water and 15 sewage projects serving 17,762 with water and 31,950 with sewage treatment.

Serious freezing problems had been experienced in the Town of Keewatin and the Township of Machin where the Province operates the complete water-works systems. As a result of new technology and the purchase of modern equipment the Ministry was able to reduce the freezing problems in the watermains and service connections by installing insulated pipe and heat tracing cables in sensitive areas.

## Laboratory

The Thunder Bay Regional Laboratory provides chemical and analytical support for the environmental programs of the Northwestern Region. During the 1980-81 fiscal period, the laboratory performed 106,000 analyses. The chemistry unit performed 76,000 analyses on 10,200 samples while the microbiology unit performed 30,000 analyses on 13,500 samples.

New chemical analytical capabilities were developed for fluoridation candle and sulphation plate analyses prior to establishing this laboratory as the sole provincial source for these analytical services. The hot block digestion-automated buffering procedure for total nutrient analysis was implemented at this laboratory.

A qualitative isolation and biochemical identification procedure was developed for *Salmonella spp.* from surface water sources using either membrane filtration or swab recovery methods.

## Environmental Planning

Fifty-five subdivision plans and 10 Environmental Assessment reports were reviewed.

## Water Resources

Forty-seven water quality monitoring stations were maintained of which 11 supported the International Joint Commission Tributary Monitoring Program. Two observation wells were also operated.

Eleven new Permits to Take Water were issued during the year and seven permits renewed.

Under the Region's Lake Inventory Program, designed to update water quality information on lakes expected to experience development, 30 lakes in the Thunder Bay and Kenora areas were sampled.

Ten water quality assessments were undertaken in relation to industrial effluents, sewage treatment plant effluents, drinking water quality, dredging of contaminated sediments, and lake eutrophication.

Five groundwater quantity and groundwater quality assessments were undertaken.

Three hundred and thirty well water records were verified. The Region evaluated the sensitivity to acidic precipitation of 150 lakes in Northwestern Ontario. Included are lakes near Atikokan monitored for potential emissions from the thermal generating plant of Ontario Hydro.

Staff continued to investigate mercury pollution in the English/Wabigoon River system studying both the potential for remedial measures and the potential impact of abatement measures by Great Lakes Forest Products Limited, Dryden Division.

Sewage treatment plants at Atikokan and Nakina have improved water quality in the Atikokan River and in Balkam Creek.

A primary clarifier at Great Lakes Forest Products' mill at Dryden resulted in significant reductions in suspended solids concentrations in the Wabigoon River.

## Air Quality

The Region operates approximately 90 instruments and recorders for air monitoring.

In 1980-81, staff undertook the following special surveys:

- PCB surveys for background data and to support cleanup operations following two PCB spills in Thunder Bay.
- Investigation of sulphur dust fallout at a local yacht club.
- Survey around an ash disposal site at Ontario Hydro's Thunder Bay generating station.
- Snow sampling near Pluswood Manufacturing Limited, a forest products manufacturing plant at Atikokan.
- Major phytotoxicology surveillance surveys continued in the vicinity of selected mining and pulp and paper industries.

In collaboration with the Air Resources Branch, long-term precipitation sampling commenced at four sites in the Region and plans were developed for additional monitoring locations. Research on the

effects of acidic precipitation on the terrestrial ecosystem of northwestern Ontario began during the year including base line soil and vegetation sampling, sensititivity mapping, and soil leaching experiments.

Five complaints of vegetation damage were investigated (two in Thunder Bay and three in Fort Frances). Only one of these was caused by air pollution.

Levels of particulate matter continued to decline in the City of Thunder Bay in response to a major, long-term dust control program completed at local grain elevators.

Dustfall and odour levels in Fort Frances showed improvement in 1980 as a result of upgraded emission controls at a kraft pulp mill.

Concentrations of offensive odours and particulate matter decreased substantially in Marathon following the commission of a new recovery furnace and a tall stack.

# Northeastern Region

Director: C.E. McIntyre

## Industrial Abatement

Four Control Orders were completed in 1980-81. Three were associated with air pollution abatement and one with both air and water.

The companies involved anticipate spending $37 million on air abatement measures and $22 million on water abatement.

During the year, Regional staff investigated 339 spills and 619 complaints.

Ministry staff held a public meeting early in 1980 to discuss extensions to the Control Order on E.B. Eddy Company Ltd. in Espanola. An amending Control Order was served on the company in May of that year.

Another public meeting was held in June of 1980 to discuss a proposed air management program for Inco Ltd. An amending control order and regulation was issued the following September.

Inco Metals Company was convicted on four charges in relation to a sulphur dioxide incident that occurred in 1978. The Company was fined $19,500.

Staff worked with the Atomic Energy Control Board on uranium mining, refining and licensing in the Elliot Lake and Blind River areas.

Abitibi-Price installed an air scrubber reducing odours at its Smooth Rock Falls operation. A new clarifier at the Spruce Falls Pulp and Paper Company is reducing the level of solids being discharged into the Kapuskasing River.

Air quality in Hearst is improving due to the shutdown of a tee-pee burner. The construction of a lagoon by CNR in Hornepayne has reduced the impact of accidental petroleum discharges on the Jackfish River.

## Municipal and Private Abatement

New water and sewage facilities were completed in ten different locations (see appendices).

Staff processed over 1,700 applications for private sewage systems, refusing approval to 35. Staff also reviewed over 1,175 severance applications involving approximately 2,570 lots.

The Region was involved with 25 private sewage funding projects.

Fourteen waste disposal sites were closed during the year because they were either filled or causing environmental problems. Seventeen problem sites were substantially improved. Twelve new sites were established and certified.

Waste Management Studies were carried out in North Bay, New Liskeard, Burk's Falls/Armour/Ryerson, Sault Ste. Marie, Elliot Lake, Cochrane, Deloro Township (Timmins) and Kirkland Lake.

One hundred and forty-two complaints associated with water wells were investigated.

Seven pump-out marinas, 12 other marinas and 37 boats were inspected.

Two cottage surveys were completed. In addition, over 400 cottages were inspected under the Ministry's Cottage Pollution Control Program.

## Air Quality

The Northeastern Region operates 150 monitors and 20 recorders. Staff also operate a central data collection system for the Sudbury airshed.

These special surveys were undertaken:

- a summer survey for sulphur dioxide, high volume sulphation and vegetation and soil monitoring near the Texas Gulf refinery in Timmins.
- a winter survey to investigate the effects of a seasonally operated smelter on air quality in Virginiatown.
- a total reduced sulphur monitoring program in Smooth Rock Falls to monitor the effects of

plant improvements at the Abitibi-Price Inc. mill.

The seedling and the white pine plot networks were expanded to continue monitoring effects of long range pollutants including acid precipitation.

Staff investigated 19 complaints of vegetation damaged by air pollution. Only one was proven valid.

The Sudbury air pollution index did not exceed 32.

## Water Quality

The Region maintained 165 water quality monitoring and stream flow recording stations. Staff issued 36 permits to take water. They also sampled 93 lakes to assess sensitivity to development or to update water quality information.

Twelve water quality assessments were undertaken, 22 lake classification evaluations and 991 well records verified.

Cottagers on six lakes were involved in the Ministry's self-help program.

As part of the Ministry's acid precipitation studies, 30 lakes were each sampled 26 times for pH, alkalinity and conductivity. Ninety lakes were sampled once.

A small, seasonally acidic stream was sampled weekly both upstream and downstream from an experimental crushed limestone barrier.

Limnological sampling was completed monthly on two Sudbury area lakes in support of MNR fish studies related to acid precipitation.

Significant resources were devoted to the refinement of a water quality model for the Serpent River System.

The MOE surface water objective for radium 226 was met in the Serpent River at Hwy 17 downstream from an uranium camp.

## Environmental Planning

Staff reviewed 68 municipal subdivision proposals and 22 environmental impact statements.

## Utility Operations

The Utility Operations Section operated 21 Water Treatment Plants and 42 Water Pollution Control Facilities during 1981 serving a total population of 236,000.

During the year the operation of five Water Pollution Control Facilities and two Water Treatment Plants serving a population of 160,000 was turned over to the Regional Municipality of Sudbury.

Staff assumed responsibility for the operation of Water Treatment Plants at Matheson, Val Gagne and Mattice and Water Pollution Control Facilities at Gore Bay, Mattawa and St. Charles.

The Utility Operations Section soil sampled more than 158 hectares (392 acres) of farmland in the Region during 1980-81 as part of its program to find suitable sites for utilization of sewage sludge.

# Southeastern Region

Director: R.E. Moore

## Industrial Abatement

During the year, one control order was issued. The company is expected to spend $100,000 on water abatement measures.

Staff investigated 158 spills and 628 complaints. Routine inspections dealt primarily with odours and dust, pulp and paper, organic chemicals, textiles, mining and metallurgy, pits and quarries, dairy industry and wood industry. Air and pollution control programs completed at Canadian International Paper at Hawkesbury resulted in reduced biochemical oxygen demand (BOD) and suspended solids loadings to the Ottawa River from the company's sludge lagoons and improved control of $SO_2$ emissions.

Improvements in the pretreatment plant at BASF Cornwall have reduced the concentrations of BOD and suspended solids discharged to the municipal sewage system.

Groundwater in the vicinity of Masterloy Products, City of Gloucester, was tested to ensure that the public is not endangered by being exposed to contaminated drinking water and to monitor any changes in the quality of the groundwater. Chromasco Limited, Ross Township, installed a baghouse on one-half of the residue handling system at a cost of $500,000 to reduce dust emissions.

E.B. Eddy Forest Products installed a sewage treatment plant for treating sanitary sewage from their

Ottawa mill. Odours of kerosene in the vicinity of Alcan Kingston were reduced by the installation of a scrubber.

## Municipal and Private

Seven new major water and/or sewage plants were completed in the Southeastern Region in 1980-81 (see appendices).

The Section received and processed 420 applications for private sewage systems. All but 12 were issued Certificates of Approval. There were no appeals.

Staff also examined 307 applications for severances involving 637 parcels of land and forwarded their findings to the appropriate authorities.

Four waste disposal sites were closed in 1980-81, three because they had reached capacity and one because of complaints. Under the Ministry's Waste Management Improvement Program, 20 sites were improved.

Regional staff handled 91 private-sewage funding projects during the year. Over 200 complaints regarding wells were investigated. Under the Boating and Marina program, 183 pleasure craft and 66 commercial marinas were inspected throughout the Region.

Phase 1 of the $1.4 million three-year Rideau River Stormwater Management Study, protecting the esthetic and recreational values of the river, was completed. The study is being conducted by M.O.E., Environment Canada, the Regional Municipality of Ottawa-Carleton, and the Cities of Ottawa, Nepean and Gloucester.

District staff met with staff of Rockland, Hawkesbury, Cornwall and Ottawa regarding additional studies of closed waste disposal sites. Cornwall has implemented a gas monitoring program while Ottawa has retained a consulting firm.

An area water supply study was conducted for the corridor between Pembroke and the Canadian Forces Base Petewawa. Various alternatives of supplying filtered water to the residents of the corridor were presented. Negotiations began with National Defence regarding their participation.

## Technical Support Section

During 1980/81, the Planning & Approvals Unit reviewed 117 official plans and amendments, 594 zoning by-laws, 125 subdivision proposals and 23 miscellaneous planning documents. A total of 423 applications for approval under Ministry of the Environment legislation and 347 applications related to programs of other agencies were reviewed. The number of environmental assessment reviews totalled 57.

Testimony was given at several Ontario Municipal Board hearings related to subdivision development.

## Water Resources Assessment

The Region maintained 93 water quality monitoring stations and operated 12 observation wells; 55 Permits to Take Water were issued.

Through a co-operative program with the local Conservation Authorities, the Region undertook sampling programs on 45 lakes.

Sixteen water quality assessment studies were undertaken to determine the impact of point source waste discharges and the surface water implications of leachate releases from landfill sites.

Three lake classification evaluations were completed in association with shoreline subdivision development proposals. Cottagers on 99 lakes were enrolled in the Region's Self Help Program. Seventy-nine of these lakes were sampled frequently enough to be included in the 1980 report, entitled 'Enrichment Status of Lakes in the Southeastern Region of Ontario'.

The Region sampled 110 lakes in its program to inventory the sensitivity of lakes to acid rain inputs. By the end of the fiscal year, the Region had sufficient information to allow acid rain sensitivity classification of 375 lakes. Eighty-two lakes are considered to be sensitive and 293 lakes are believed to be insensitive.

During the 1980/81 fiscal year, the Region became involved in a major new activity. On an Interministerial Drainage Petition Review Committee, staff evaluated the water quality implications of 120 agricultural drains proposed for construction under the Drainage Act, 1975. Significant potential environmental concerns were identified with 12 of the proposed drains and general water quality concerns were raised with the design and construction of the remainder of the drains. As a result, more attention was given to drainage design and construction details and some drains were redesigned to mitigate the more serious Ministry concerns.

Municipal sewage treatment plant abatement measures have reduced point source phosphorus loadings to the Bay of Quinte from a former high of 214 Kg/day to 72 Kg/day in 1980. A decline in phosphorus and chlorophyll levels has been documented throughout the Bay of Quinte, along with a general public perception of improved water clarity and evidence of improved municipal drinking water quality. The Bay of Quinte walleye fishery has also experienced a dramatic resurgence.

## Air Quality

The Region operates 20 continuous air monitors with recorders, and 40 passive and intermittent monitors.

A continuous $SO_2$ monitor was installed in Hawkesbury to provide information on emissions from CIP. Several short term special studies were conducted at Bancroft (radioactivity), Deloro and Kingston (arsenic and heavy metals) to obtain information on localized problems.

Several complaints of vegetation damage were investigated, but only one incident of air pollution damage was substained. The Region continued to maintain its monitoring station for total reduced sulphur (TRS) at Domtar, Cornwall. The station allows for more effective abatement strategies to be employed by plant operators. The $SO_2$ in Hawkesbury and TRS in Cornwall are now under better control and should show a reduction over the next few years.

## Laboratory Operations

Automated facilities to measure low level alkalinities in support of the acid precipitation program supported both MOE and MNR lake assessment programs.

The Kingston laboratory routinely provides water and waste analysis for all federal establishments in the Region as well as analytical support for the Ministry of Natural Resources' fisheries and hatcheries activities. Fluoride and nitrate analysis is provided for all Health Units in the Region.

Several analyses reports were prepared on request for Health Units wishing to take legal action in cases of improper sewage disposal.

In addition, several requests for analysis and consultation from federal and municipal governments and industry were answered.

The Kingston laboratory performed 109,689 chemistry tests on 14,904 samples. It also performed 51,783 microbiology tests on 23,844 samples.

## Utility Operations

The Region operated 40 sewage projects serving a total population of 206,224 and 23 water projects serving a total population of 77,540.

In 1980 the water project of the Village of Wellington in the County of Prince Edward with a population of 1,067 was turned over to local authorities.

The Region also developed an overall plan for the containment of arsenic residue left by the abandonment of the gold mining and refining plant operations.

# West Central Region

Director: G.H. Mills

## Industrial Abatement

Four Control Orders were issued, one of which was completed in 1980-81. Two were associated with air pollution abatement, the rest with air and water pollution abatement. The companies involved anticipate spending over $73.7 million for air pollution abatement and over $40.9 million for water pollution abatement over the duration of the orders.

One directive was issued as well as 17 requirements. Thirteen of the requirements were related to discontinuing the use of apartment building incinerators which could not meet Ministry air quality standards.

Staff investigated 141 spills and over 1,250 complaints. Many involved odours from industries or farms.

Inco Metals installed a wastewater treatment plant to remove nickel from its industrial discharge.

Norton Company shut down its Crystoloden facility, thereby reducing hydrogen sulphide and sulphur dioxide emissions.

Fraser Inc. (formerly Abitibi Provincial Paper) installed a wastewater treatment facility to reduce the quantity of organic material discharged from its de-inking operation.

Sod was removed and replaced at Manchester Public School in Cambridge to eliminate potential metal contamination problems resulting from emissions by Cambridge Brass.

An environmental survey of Date Industries Ltd. in Ayr resulted in the installation of a new baghouse collector on the sand handling system, which should alleviate high dustfall levels.

Rockwell Manufacturing Ltd. in Guelph completed the installation of electric induction furnaces to replace existing cupolas. These furnaces have solved the problem of particulate emissions.

Rothsay Concentrates Co. Ltd., in Rothsay, developed an odour abatement program involving revamping of existing odour control equipment and installation of three-stage chemical scrubbing on high intensity odours.

## Municipal and Private Abatement

Ten major water and/or sewage projects were completed in the West Central Region in 1980-81 (see appendices).

Nine solid waste management sites were closed, mainly because they had reached capacity. A tenth site was closed because its location and topography were not suitable. One new site was opened.

A number of waste management studies were completed. These included reports on alternative sewage handling systems for the Regional Municipality of Haldimand-Norfolk the location of old solid waste disposal sites and the identification of potential problems, and a feasibility study on an Energy from Wastes project in the Niagara Region.

Regional staff investigated 165 complaints. There were 73 inquiries related to private well problems.

Under the Ministry's boating and marina program, staff inspected 330 boats and 35 marinas. Owners of 10 boats and the operation of one marina were found in violation.

The City of Niagara Falls and the Regional Municipality of Niagara agreed to undertake a major storm water separation program in Niagara Falls to eliminate the Stanley Avenue outfall which has had an adverse impact on the Welland River water quality.

A new sewage treatment plant with tertiary treatment facilities in the Village of Shelburne discharges an improved effluent into the Boyne River (the river is regarded as an excellent trout fishery). The plant is unique in that it can use existing sewage lagoons for holding final effluent for up to two months. Sewage can, therefore, be held back during the spring and fall fish spawning seasons.

## Environmental Planning

Staff reviewed 86 municipal subdivision proposals, over 80 proposed official plan amendments, a comprehensive zoning bylaw and approximately 20 Environmental Impact Statements or reports.

## Water Resources

Eighty-four water quality monitoring stations, seven automatic streamflow recording stations, six manual streamflow recording stations and 25 observation wells were maintained.

One hundred and thirty-nine surface Water-taking Permits and 25 groundwater permits were issued. Nineteen of each of these were new permits.

The sensitivity of Pike Lake to development was evaluated.

Stream water quality assessments were completed for nine municipalities on the Upper Grand Watershed and the assessment of the impact of the sewage treatment plant at Orangeville on the Credit River was continued.

Twenty-five groundwater quantity and quality investigations were carried out. About 1,700 well records were verified. Preliminary investigations started on the potential use of the South Cayuga site for industrial waste treatment.

A review was carried out on the waste site identification study which identified 24 industrial and 54 municipal disposal sites. Follow-up field studies were conducted on 14 of these sites.

About 1,000 requests for groundwater data, 300 for surface water data and 500 for fish contaminants data were answered. Twelve fish kills were investigated. Twelve marine construction evaluations were carried out.

Leachate from the Upper Ottawa Street Landfill Site was redirected from Redhill Creek to the sewage treatment plant.

## Air Quality

The Region's air quality monitoring network operated 192 devices.

The following special air quality surveys or monitoring programs were undertaken:

- Smithville—Concern for high PCB readings near a transfer station.
- Diamond Shamrock, Hamilton—Investigation of odour complaints due to various organic compounds.
- Uniroyal, Elmira—Identification of organic compounds associated with the manufacturing process.
- Upper Ottawa Street Landfill Site—Monitoring air quality in the vicinity of the landfill site.

There were 12 complaints alleging vegetation damage due to industrial emissions. All were investigated and reported on by the Phytotoxicology Section of the Air Resources Branch and were found to be due to natural causes.

The API exceeded the advisory level of 32 six times for a total of 84 hours in Hamilton. The alert level of 50 was not reached. No values in excess of 32 were recorded at St. Catharines and Niagara Falls.

## Pesticides

Approximately 175 pesticide related complaints were investigated. Approximately 500 routine inspections on the premises of licenced retail and wholesale pesticide vendors were carried out.

Over 70 permits, to use or purchase pesticides, were issued under the Pesticides Act.

## Utility Operations

The Region was responsible for the operation of 37 water pollution control plants, serving a population of approximately 410,000.

The Elora Water Pollution Control Plant was turned over to the municipality.

# Central Region

*Director: D.P. Caplice

## Industrial Abatement Section

Three Control Orders dealing with air emissions were served and one Director's Order under Section 41 of The Environmental Protection Act dealing with air emissions was served as well.

During the year, the capital expenditure by industry to abate existing problems was $56,179,896 for programs associated with air pollution abatement and $2,872,700 for water.

Staff investigated 204 spills and 3,386 complaints. Routine inspections dealt primarily with air and water emissions.

Additional control and maintenance activities at the Shell and BP refineries in Oakville resulted in an improvement in air quality and a significant reduction in the number of complaints.

Canada Metal Company Limited in Toronto completed its Control Order in early 1981 at a cost of approximately $1.25 million.

Eldorado Nuclear Limited in Port Hope installed a water condenser in its uranium nitrate boildown stack to reduce emissions.

Union Carbide, in Lindsay, completed the construction and started operation of an evaporation and crystallization system for recovery and treatment of concentrated waste sodium sulphate and ammonium sulphate solutions. This eliminated the need for the disposal of these solutions in landfill sites.

## Municipal and Private Abatement

Seven major water and/or sewage projects were completed in 1980-81 (see appendices).

The Municipal and Private Abatement Section received 1,233 applications for private sewage systems. Staff issued 1,196 certificates. They also reviewed 548 applications for severances involving 1,189 parcels of land.

Staff dealt with seven projects under the Ministry's Private Sewage Funding program.

Three waste management sites reached capacity and were closed. One incinerator was closed for environmental reasons, 14 waste sites were improved and one new site was opened in Ops Township to serve the Town of Lindsay and the Township.

The Muskoka District area-wide and the Metropolitan Toronto Area Waste Management Studies were completed in 1980. Both studies were in part funded by the Ministry.

Twenty-six well complaints were investigated. During the summer of 1980, 1,041 boats were inspected, 31 violations were recorded, and 143 marinas were inspected. During the year, 1,586 cottages were inspected in Haliburton, Muskoka and in Victoria under the Cottage Pollution Control Program.

The abandoned site preliminary studies were completed on 54 priority sites in the Region. The main concern of the program is that methane gas could gain access to buildings and structures. The reports from the reviews were forwarded to the municipalities with the request that where a hazard was evident, that remedial works be installed and that building on hazard lands be controlled. At one site in Brampton, gas was detected in homes and detection devices were installed by the municipality.

## Air Quality

During 1980-81, approximately 600 instruments monitored air quality in 25 communities throughout the Region.

In general, the highest levels of pollutants in the region are found in downtown Toronto. In Toronto, the significant improvements in air quality achieved during the 1970s have been maintained. The greatest success has been the decrease in sulphur dioxide levels. In the past year, none of the criteria for sulphur dioxide has been exceeded. Lead levels throughout the region have decreased because of the increasing use of unleaded gasoline.

The Toronto air pollution index remained below the advisory level of 32 during 1980. This is the first year since the start of the index in 1970 that this objective has been achieved. The highest level reached was 31 on December 8, 1980.

Other highlights:

The air monitoring program was expanded by the establishment of a major monitoring station in the Junction Triangle area of Toronto. In addition, the station in Oakville was relocated to be closer to the Shell-BP refinery complex.

The intensive lead monitoring program around secondary lead smelters and major lead users was

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*D.P. Caplice is attending the Department of National Defence Senior Officers Training Program from September, 1981 to August, 1982. The Acting Director for the Central Region during this period is G. Mierzynski.*

continued. The most dramatic decrease in lead levels was found in the vicinity of the Canada Metal plant on Eastern Avenue in Toronto as a result of the implementation of a control order issued by the Ministry.

Asbestos monitoring was continued on an intermittent basis around the major asbestos users in the region. The largest user, the Canadian Johns-Manville plant in Scarborough, closed its asbestos operations and monitoring was discontinued. In general, the asbestos levels were below the guideline concentration deemed acceptable.

Radioactivity levels were monitored in the vicinity of the Pickering Nuclear Generating Station, and the Eldorado Nuclear plant in Port Hope. Levels were generally similar to those monitored in downtown Toronto.

In a joint survey with the Toronto Transit Commission and the Ministry of Labour, pollutant levels consisting of suspended particulate, lead, iron, carbon and asbestos, in the Toronto subway system were monitored. As a result of changes in the composition of brake shoes used on the subway cars, pollutant levels were significantly decreased. The most outstanding decrease was found in lead levels which fell below the desirable ambient air quality criterion. The survey concluded that there was no discernible health hazard to TTC employees or to passengers.

## Water Resources

Stream water quality monitoring stations were maintained at 208 locations. Eleven recording and 11 periodic stream flow stations, as well as 29 recording observation wells, were maintained.

Water quality studies were carried out on 11 lakes to determine their present trophic status and to assess their sensitivity to future development.

Water quality monitoring programs on Lake Simcoe were expanded. The yearly ice-free water quality monitoring program was increased from three to nine lake stations, plus one on the lower Holland River. Additionally, a weekly winter monitoring program, using one sampling location was put into operation.

Water quality assessments were carried out on five water courses to evaluate the impacts of both existing and proposed municipal and industrial discharges.

An aquatic macrophyte assessment of Sturgeon Bay, in the Georgian Bay area was conducted in relation to a proposed Victoria Harbour sewage treatment plant discharge.

There were 33 groundwater quantity and 72 groundwater quality investigations. The environmental impact of 54 active and proposed municipal and industrial landfills was assessed. There were 1,334 water well records verified and 3,235 records were received for verification.

Seventy-five lakes were involved in the cottagers' self-help program.

Information on the existing pH and alkalinity levels were obtained from 50 lakes in the District of Muskoka and Counties of Haliburton and Peterborough. This was part of the province-wide baseline data collection effort.

The Groundwater Group was involved in the environmental impact assessment of abandoned landfill sites in the Region; 58 municipal and 17 industrial sites were studied.

Based on limited water monitoring results, the water quality of the lower reach of Duffin Creek has shown improvement. This is likely due to the redirection in 1980 of the Duffin Sewage Treatment Plant's flows from the creek to the York-Durham sewage system.

## Planning and Approvals

Environmental Planning Staff reviewed 430 subdivision plans (increase of 12.5 per cent over the previous year) and 382 official plans and official plan amendments (increase of .5 per cent over previous year). They were also involved in 87 approvals for the Niagara Escarpment Commission, Parkway Belt, Pit and Quarry Applications and 35 Environmental Assessment Reviews, Pre-Submissions and consultations (46 per cent increase).

The Environmental Approvals sub-section issued the following Water Taking and Industrial Approvals in 1980-81:

WATER TAKING APPROVALS

| | Ground-water | Surface Water | Total |
|---|---|---|---|
| New Permits | 23 | 22 | 45 |
| Letters of Approval | 22 | 7 | 29 |
| Renewals | 10 | 54 | 64 |
| | | | 138 |

INDUSTRIAL APPROVALS

| | | |
|---|---|---|
| Certificates of Approval for emissions to the atmosphere— | | 353 |
| Certificate of Approval for emissions to water— | | 14 |
| | Total | 367 |

Increases of 10 per cent over 79-80.

## Utility Operations

The Region operates 18 sewage plants and 14 water plants serving a population of 520,000.

Discussions continued with Region of Peel with regard to the turnover of the South Peel system, serving a population of 400,000 in the Regional Municipality. Projects in Durham, York and Halton Regions are now operated by the Regions. This includes the new York-Durham Duffin Creek system.

# Southwestern Region

Director: D.A. McTavish

## Industrial Abatement

Regional staff initiated and completed three control orders: two air pollution abatement and one water abatement. Local industry spent $8 million for air and $6.5 million for water pollution control installations.

As a result of continuing problems of gross discharges of liquid manure into streams causing major kills of fish, the Southwestern Region continued efforts to inform farmers of the seriousness of this problem and the measures necessary to bring the situation under control. Charges were laid by the Ministry resulting in convictions of three farmers. This year, only 244 applications for Agricultural Certificates of Compliance were received which represents a reduction of about 65 per cent compared to the numbers dealt with in each of the previous two years.

Significant progress has been made in reducing fluoride emissions from the Allied Chemical hydrofluoric acid plant in Amherstburg. The success of abatement efforts is reflected in a reduction of average fluoridation rate in the vicinity of this plant from 165 to 25 micrograms/100 $cm^2$/month. The Ontario ambient air quality criteria for this contaminant is 40 and 80 micrograms/100 $cm^2$/month depending on the season.

## Municipal and Private Abatement

Fourteen major water and/or sewage projects were completed in the Southwestern Region in 1980-81 (see appendices).

Regional staff received 249 applications for private sewage systems; 245 of these were granted Certificates of Approval. In addition, 199 severance applications involving 314 parcels of land were inspected and written reports were made to the appropriate authorities.

Four private-sewage grant projects were handled by the Region.

While one site in the County of Oxford was closed, 21 waste management sites were improved using the funds in the Waste Management Improvement Contract.

Approximately 300 well complaints were investigated by Regional staff.

One hundred and five boats were examined; four were found to be in violation. Four marinas were also inspected.

## Air Quality

There were 130 monitoring instruments, including 51 Hi-Vol particulate samplers, operating in the Southwestern Region in 1980-81. In addition, dustfall samples were collected at 42 sites and fluoridation rates were determined for 39 sites. A total of 45 recorders were operated.

Special air quality surveys or monitoring programs undertaken in 1980-81 were:

- measurements of total suspended particulates, heavy metals in total suspended particulates, nitrates, sulphates and organic compounds, in the vicinity of the Ridge Landfill site in Harwich Township;
- measurements of lead levels in total suspended particulates in the vicinity of Exide Canada Inc., Woodstock; and
- measurements of total suspended particulates and dustfall in the vicinity of Western Foundry, Wingham.

Air quality data and reports were exchanged with agencies in Michigan in accordance with the Memorandum of Understanding on Transboundary Air Pollution Control in Southwestern Ontario—Southeastern Michigan Area.

Monitoring for radioactive constituents in total suspended particulates continued as part of the Bruce Nuclear Power Development Contingency Plan. The Ontario Ministry of the Environment section of the Survey Co-ordinating Group Procedural Manual was prepared for the BNPD site contingency plan.

The Air Pollution Index exceeded 32 on only one occasion when it reached a maximum of 34 in Sarnia on February 16, 1981.

Levels of total suspended particulates were drastically reduced in the vicinity of the Windsor casting plant of Ford Motor Company of Canada, Limited as a result of additional pollution control equipment, reduced production and ultimate plant shutdown in September 1980.

## Water Quality

The Region monitors the quality and quantity of both surface and ground waters with its monitoring network. With the co-operation of local Conservation Authorities, the water quality of rivers and streams is measured monthly at approximately 130 locations. Measurements of streamflow are also made, either through the use of continuous-recording instrumentation, or through the use of spot measurements, at about 30 stream locations.

Groundwater monitoring in the Region was achieved through

(1) the use of 31 observation wells;
(2) through the water well program in which 2338 new wells were inspected; and,
(3) through the investigation of 254 inspections relating to existing or potential problems.

Numerous specific groundwater and surface water studies were also carried out. Groundwater studies resulted in 93 reports regarding the present or possible impact of landfill sites, subdivision proposals, well tests, etc. Detailed groundwater surveys were

carried out in Sydenham Township to evaluate agricultural impact, in Harwich Township to evaluate groundwater sensitivity to a proposed industrial-waste landfill, and at Markdale to determine the feasibility of a sewage infiltration system.

Specific water surveys were carried out to determine the impact of five municipal sewage plants and four sewage lagoons on surface waters. The future impact of numerous sewage plant and lagoon expansions was also predicted, and waste-loading guidelines were established. The Region also worked with the Water Resources Branch in connection with the Listowel Artificial Marsh Project, and the Stratford-Avon River Environmental Management Project.

A total of 31 lakes and bays were sampled to assess sensitivity to development or to update water quality information.

Thirty fish kills were investigated, with the majority of these being caused by agricultural spills and discharges. Staff assisted the Ministry of Natural Resources in opposing the Folden's Creek drain near Ingersoll, and a report was prepared on Judges Creek (Bruce County) defining adverse impact from a drain clean-out. In addition to the Judges Creek report, major reports on surfacewater resources included the report on the Bayfield River, and the report on Winter Lagoon Data.

Staff issued 158 Permits To Take Water.

## Environmental Planning

The Environmental Planning Section reviewed 100 municipal subdivision proposals and 11 formal submissions under the Environmental Assessment Act.

The Approvals and Planning Unit co-ordinated and provided regional input to the review of 184 plans, amendents, zoning orders, Niagara Escarpment permits and Ontario Municipal Board referrals. It also co-ordinated and provided technical support input to the Region's response on over 210 engineering reports, Certificates of Approval ensuring compliance with air quality requirements, permits for water taking, as well as submissions by the Ministry of Natural Resources under the Pits and Quarries Control Act and the Lakes and Rivers Improvement Act.

## Laboratory Operations

The London Regional Laboratory performed 180,574 chemistry tests on 19,781 samples and 49,753 microbiological tests on 16,741 samples in 1980-81.

Developmental work on the media for *Clostridium perfringens* and *Yersinia enterocolitica* was completed. Both of these analytical capabilities are now available in the Southwestern Region.

## Utility Operations

Staff were involved with the operation of 64 sewage treatment facilities, 26 water supply facilities and 39 other miscellaneous projects, such as water distribution systems and pumping stations, serving a total population of approximately 730,000.

One tertiary sewage treatment plant and three sewage lagoon facilities with collection systems were completed in 1980-81. As well, a water supply and distribution system was completed at Plattsville and water was supplied from pipelines to Dashwood and Shrewbury-Raglan. Seven sewage projects and three water projects were under construction at year end.

# Laboratory Services Branch

Director: G.C. Ronan

The Laboratory Services Branch provides Ministry branches with chemical and microbiological analytical support for their environmental assessment and pollution control programs. The Branch participates in planning programs requiring analytical expertise and assists in data interpretation. Updating analytical methods and developing procedures for measuring new environmental pollutants are other key Branch activities.

Staff participate in environmental research projects aimed at clarifying the interaction of atmospheric, terrestial, and aquatic pollutants with the environment and their effect on human health. The Central Laboratory provides technical and quality control advice to the regional laboratories in Thunder Bay, London and Kingston.

In response to the workload demands, the Central Laboratory increased its test output by 10 per cent over last year. 1,240,000 tests were completed compared to 1,130,000 in 1980.

## Analytical Test Production

The laboratory provides input to sampling survey planning, expertise in data assessment, and a wealth of analytical data. Table 1 shows this year's test load summary compared to last year's.

**TABLE 1: LABORATORY TESTLOAD SUMMARY**

**1980 - 1981**

| Laboratory Sections and Regional Labs. | Chemistry (in thousands) 79/80 | Chemistry (in thousands) 80/81 | Microbiology (in thousands) 79/80 | Microbiology (in thousands) 80/81 | Total 79/80 | Total 80/81 |
|---|---|---|---|---|---|---|
| London | 166.4 | 180.6 | 43.4 | 49.8 | 209.8 | 230.4 |
| Thunder Bay | 70.4 | 75.7 | 35.8 | 30.0 | 106.2 | 105.7 |
| Kingston | 85.0 | 109.8 | 45.0 | 51.8 | 130.0 | 161.6 |
| Regional Sub-Total | 321.8 | 366.1 | 124.2 | 131.6 | 446.0 | 497.7 |
| Inorganic Trace Contaminants | 283.4 | 357.1 | | | 283.4 | 357.1 |
| Water Quality | 649.8 | 655.5 | | | 649.8 | 655.5 |
| Pesticides (Scans) | 7.7 | 8.7 | | | 7.7 | 8.7 |
| Organic Trace Contaminants | 51.8 | 91.8 | | | 51.8 | 91.8 |
| Microbiology | | | 135.8 | 128.9 | 135.8 | 128.9 |
| Central Lab Sub-Total | 992.7 | 1113.1 | 135.8 | 128.9 | 1128.5 | 1242.0 |
| TOTAL | 1324.5 | 1479.2 | 260.0 | 260.5 | 1574.5 | 1739.7 |

## Clients and Programs

The laboratory's clients consist mainly of the Regions and the Environmental Assessment and Planning Division. Discussions on sampling timing, survey size, and priorities helped serve as a regulator on analytical production in many of the diverse sampling programs and emerging programs like Acidic Precipitation in Ontario Study and priority pollutants scanning for air-borne and water-borne organics access were given increased analytical support.

Close to 70 per cent of the overall test production in the Ministry was in support of regional activities.

Table 2 shows the laboratory workload according to major programs and surveys, distributed between regional and head office clients.

The 1980-81 fiscal year saw a continuation of the high laboratory usage for major programs, as well as the emergence of the Acidic Precipitation in Ontario Study (APIOS) as a major user of laboratory capacity. Over 150,000 tests were performed in support of this growing program, for anions, nutrients, metals and microbiological parameters on a wide range of sample types (precipitation, fish, algae, soil).

Organic analyses continued to have a high profile and increased demand. Besides large-scale monitoring programs such as trihalomethanes in water and PAH's in air, extensive organic analysis was required in problem solving and contingency situations for regional and head office groups. The water monitoring program for Niagara-on-the-Lake and St. Catharines was the largest single user of the Mass Spectrometer-GC system, while analysis of organics associated with landfill sites and industrial wastes monitoring were other major users of the increasingly sophisticated organic analysis capability of the laboratory. Concern about toxic material issuing from the Niagara Falls, New York area also resulted in a high demand for tests of drinking water for dioxin, PCB and Mirex.

In the Pesticides Section, modifications to the dioxin laboratory were completed, but the above-noted increases in requirements for dioxin analysis quickly resulted in a back-log.

The Water Quality Section saw major workload increases due to marshland studies, Great Lakes sampling, and recreational lake studies.

The Water Quality and the Inorganic Trace Contaminants Sections both had major workload increases due to APIOS, Stratford-Avon Study, landfill monitoring and the sludge application projects.

The Characterization of Hauled Liquid Industrial

Wastes (CHLIW) project had a major impact on the Organic and Inorganic Trace Contaminants Sections as well as the Water Quality Section, as several thousand tests had to be performed on a very complex series of industrial samples.

Fish continued to be used as an indicator of organic and inorganic water pollution. While demands for the analysis of mercury and PCB in fish declined, metals such as aluminum, lead and zinc were in increasing demand. Requests for lead analysis in air, water, and vegetation saw a remarkable increase this year, as nearly 40,000 lead tests were completed.

Metals other than lead that had a high demand rate (over 15,000 tests each) were: zinc, copper, nickel, iron, chromium, aluminum, mercury, and arsenic.

In the Microbiology Section, most work was carried out in connection with surveillance of municipal drinking water quality. Major surveys were conducted in the Niagara River, Lake Ontario, St. Mary's River (Sault Ste. Marie) and around Toronto Harbour and Hamilton Harbour. The Lakeshore Capacity Project terminated this year.

The Biohazards Unit underwent renovations this year, but still completed a survey of industrial effluents discharging to the St. Clair River, which were analyzed for the presence of mutagenic and DNA-damaging activity. Virology studies were carried out on several sewage treatment plants and bathing sites on rivers and lakes.

Analysis of samples taken as a result of public complaints were numerous this year, and required innovative applications of microbiological, organic and inorganic investigative techniques.

Many of these cases resulted in extensive analytical reports which were used as court evidence, the basis for insurance claims, supporting information for Ministerial orders.

Highlights of these studies:

(1) The use of X-ray diffraction and polarizing light microscopy to identify as mineral wool (and not, as suspected, asbestos), an insulation material which had become air-borne during the stripping of steel columns in the vicinity of a public transportation depot in Toronto.

(2) The identification of an orange colored deposit on the surface of vehicles in the vicinity of an industrial metal treating plant in Toronto through the use of the electron microprobe device. (The analysis showed the deposit to be iron chloride resulting from plant emissions).

(3) Using light and electron microscopy to determine the source of 'paint overspray' which caused esthetic damage to automobiles in Central Region.

(4) Using X-ray diffraction and light microscope techniques to identify fallout causing damage to painted surfaces in the vicinity of a West-Central Region quarry as emissions from the operations associated with the quarry.

(5) The identification and comparison of fallout as a result of the sand-blasting operation at the Burlington Skyway using optical and electron microscopy as well as atomic absorption spectrophotometry.

(6) The identification of a 'soot-like' fungus which proliferates on painted surfaces and vegetaton in samples submitted from all regions except North-West. This problem has occurred in past years but 1980-81 showed a tremendous increase in the number of complaints from people believing it to be the result of industrial emissions.

Several special ventures were undertaken by the laboratory this year, including construction by the Water Quality Section of a completely self-contained mobile laboratory to support various field programs; a residual chlorine field study of Toronto Sewage Treatment Plant effluent into Lake Ontario, performed on board the vessel Guardian No. 1; and a chlorine study of the Thames River. Staff also performed complex field arsenic speciation studies on drinking water sources in the Sudbury area, and metal speciation in the field at various Ontario Lakes. Laboratory staff trained regional MOE personnel in the setting up and operation of a field arsenic analysis system to monitor the arsenic waste treatment system installed at Deloro, South-East Region.

## Administrative Services

The initial implementation of the Laboratory Information System, a computerized data storage and processing system, began in the fall of 1980. At the end

**TABLE 2: TEST PRODUCTION 1976—1981**

| Year | Regional Laboratories | Toronto Laboratory | Laboratory Services Branch |
|---|---|---|---|
| 1976/77 | 378,000 | 1,272,000 | 1,650,000 |
| 1977/78 | 420,000 | 1,360,000 | 1,780,000 |
| 1978/79 | 440,000 | 1,262,000 | 1,702,000 |
| 1979/80 | 446,000 | 1,144,000 | 1,590,000 |
| 1980/81 | 498,000 | 1,242,000 | 1,740,000 |

of the fiscal year, approximately forty per cent of the samples submitted to the central laboratory were being handled by the LIS. During this implementation phase a number of system faults have been corrected and several changes have been made which will improve the system's delivery of detailed analytical and sampling data to laboratory clients.

## Central Stores

The Central Stores Unit issued $900,000.00 worth of chemicals, glassware, sample kits and small equipment items in support of Ministry sampling and analytical activities. Thirty-two thousand sampling kits were issued to field sampling staff and 700,000 bottles and tubes were processed for sampling and analytical use. Local purchasing was established to provide a more effective and flexible system for obtaining goods and services under $500.

## Other Activities

The laboratory newsletter "Analysis" continued to provide readers with information on items of environmental interest and on developments in the field of environmental analysis. Circulation is up to 800 copies per issue. The newsletter was joined by a second laboratory newsletter dealing exclusively with dioxin news. Circulation is restricted to 150 scientists worldwide.

Quality control continued to be an integral part of all Branch operations. Approximately 100,000 analytical tests were performed in addition to those reported to clients, in support of the numerous quality control programs in the sections. Round robin samples and other interlaboratory materials were exchanged with dozens of similar institutions in the U.S., Europe, and other provinces, covering virtually every type of sample (fish, water, sediment, soil, air particulates) for most parameters, in an on-going effort to validate and control the analytical data being reported to clients. In general about five per cent of the analytical output is devoted to the continuous effort of systematizing and maintaining quality control.

# finance and administration division

Executive Director: G.E. Higham

## Financial and Administrative Services Branch

Director: W.D. Wood

### Accounts Payable

In 1980-81, the Accounts Payable Section processed 148,600 invoices amounting to $129,232,803 and disbursements and charges amounting to $124,240,664.

### Financial Reporting and Control Services

The Financial Reporting and Control Services Section is responsible for maintaining an effective management information system and providing budgetary controls for all Ministry expenditures. This section is also responsible for: improving financial control and contributing to greater efficiency of the entire financial management program of the Ministry by maintaining and developing a comprehensive financial analysis system; providing reconciliation services for Management Information System and Integrated Personnel Payroll Employee Benefits reports; providing cashier, cheque distribution and mail services; and preparing the Ministry's annual public accounts submission.

### Systems Operations

New responsibilities for the Systems Operation Section included the implementation of the following:

(1) a forms management system for the Records Management Section; and,

(2) a skills resources inventory system on behalf of the Personnel Services Branch.

Updating of the above new systems is the responsibility of the Systems Operations staff.

## Purchasing

During the year, the Purchasing Section processed 9,004 purchase orders for a total value of $36,831,000.00.

## COBIS Development and Support

COBIS is a multi-ministry financial system designed to store, process and report expenditure data for individual user Ministries as well as provide requisitions for payment and computer files of central account and payment data to the Ministry of Treasury and Economics. At the beginning of the year, the group which supports this system with systems analysis and computer programming services was transferred to this Ministry. During the year, the major development thrust was to provide more options in the number and content of budget and expenditure management reports.

In most cases, the water and sewage plants were also operated by the Ministry. The statutory and contractual acitivities in this area include: conducting service rate reviews (120 in 1980-81); maintenance of accounting records, the reporting of financial aspects of various water and sewage projects as required by agreements and legislation; assisting municipalities in implementing billing and collecting procedures under various service and term agreements and assisting in bylaw reviews when requested. The gross revenue generated by these acitivities in 1980-81 amounted to $82.5 million.

## Cost Sharing Agreements and Grants

Administration of claims under the Canada/Ontario cost sharing agreements resulted in reimbursement of expenditures of $1.2 million.

Loans from the Canada Mortgage and Housing Corporation amounted to $29.8 million.

Provincial Assistance on projects under Service Agreements amounted to $45 million. Direct grants to municipalities amounted to $48.7 million. In addition, claims processed under the Community Services Contribution Program amounted to $23.2 million.

# Capital Financing Office

Manager: C.D. Mialkowsky

## Water and Sewage Works

Financial management was provided for 765 projects under agreements with municipalities and industry. The following table is an analysis of the financing of 500 Term Loan Agreements and for 265 Provincially owned works under Service Agreements.

**Investment in Water and Sewage Works as of March 31, 1981**
*(at cost less recoveries)*

| | 1981 | 1980 |
|---|---|---|
| | *($ millions)* | |
| Term Loan Agreements | | |
| Water Works | 38.7 | 36.1 |
| Sewage Works | 55.9 | 58.2 |
| Service Agreements | | |
| Water Works | 306.8 | 298.5 |
| Sewage Works | 715.0 | 668.9 |
| Total Investment | $1,116.4 | $1,061.7 |

# Systems Development

Manager: G. Scanlon

In 1980-81 the Systems Development Section in conjunction with User Branches worked on a wide variety of projects. The following are brief descriptions of some of those projects.

- Utility Rate Information System (URIS): The system was expanded to include a new selective retrieval system and optimized to improve operating efficiencies.
- Hazardous Contaminants Inventory System: The system was modified to permit the storage of new data fields on the master file. Several new report modules were added to the system. Contaminant inventory data for selected companies is being stored.
- Industrial Monitoring Information System (IMIS): A committee was established and a number of meetings held with the Regional Branches to define the requirements for an

automated system. A Quality Review Board was then set up to oversee the development of the system, to take place in the next fiscal year.

- Total Utility Monitoring and Management Information System (TUMMIS):
  The development of the TUMMIS system—Phase I commenced late in the fiscal year with implementation planned for August 1981.
- Laboratory Information System:
  The system was operational in early 1981. Management Information Report Modules were developed and implemented during the fiscal year as well as minor modifications to upgrade the system.
- Regional Data Processing:
  A project proposal regarding the development and implementation of the Regional Data Processing Strategy developed during the fiscal year was approved by the Systems Review Board.
- Waste Site Information System:
  Phase I of the system, concerning waste site descriptions, was implemented.
- Industrial Liquid Waste Waybill System:
  Several new report formats were added to the system as well as a new selection method.

# Internal Audit Branch

Director: E.F. Heath

The Internal Audit Branch is a central support function responsible for providing management with objective assessments of the financial and management controls under which Ministry programs and activities operate.

With the introduction of the comprehensive auditing concept, approved by the Central Agencies in late 1980, the branch commenced planning to implement this new approach so as to extend the audit scope to cover operations more fully with respect to efficiency, effectiveness and economy.

The major audit responsibilities are as follows:

- To identify and evaluate the adequacy of financial and administrative control aspects of Ministry operations;
- To determine the accuracy of claims from outside agencies and municipalities with respect to grants and transfer payments;
- To assist management by performing an independent review of any area of special concern;
- To communicate findings, suggestions and recommendations in a manner which will encourage and support corrective and/or constructive actions by managers within the Ministry in accordance with their responsibilities and authority.

During the fiscal year the branch carried on with the implementation of the comprehensive auditing program, and continued its multi-year program of conducting operational and financial audits in the Ministry offices and plants throughout the province.

In addition, during 1980-81, over 300 audits were performed on three Grant Programs administered by the Ministry of the Environment, namely the C.S.C.P. Grant Program, the Up-Front or Direct Grant Program and the Private System Grant Program. These programs were designed to provide financial assistance to municipalities and agencies for sanitary and water system projects throughout the entire Province. The total expenditure for these grants for the fiscal year 1980-81 was $59.5 million.

# Information Services Branch

Director: R.J. Frewin

The Information Services Branch provides a full range of communications and public information services aimed at keeping the public informed of the Ministry's policies and activities. During the year, the Branch produced and distributed 110 news releases, 36 statements and speeches and a wide range of publications, reports, newsletters and both printed and audio-visual educational materials.

Major publications produced during the year included a brochure on acid rain entitled "The Case Against the Rain" and the three annual volumes of "Guide to Eating Ontario Sport Fish", which have been published since 1978.

The acid rain report describes the extent to which Ontario is affected by acid rain, the programs the Province has underway to meet the challenge and addresses the need for action both in Canada and the U.S. to curb acid rain pollution. Copies of the report were distributed widely throughout the U.S., particularly in the mid-west where major sources of acid rain exist and in the north-east where significant acid rain effects have been measured.

The fishing guides, which cover fish species in Northern, Southern Ontario and the Great Lakes, were revised to include the latest test results. This is the fifth consecutive year that the results have been published as part of Ontario's fish testing program conducted in co-operation with the Ministry of

Natural Resources. The guides contain analysis for possible trace contaminants such as mercury, PCB, mirex and DDT. More that 54,000 fish from 878 Ontario water bodies have been tested and reported to date. Monthly bulletins on test results are also issued.

Five issues of the Ministry newspaper, "Legacy" were published and distributed to about 20,000 subscribers.

Major advertising activities during the year included a print campaign in support of the Ontario Federation of Anglers and Hunters "Pitch In" program; the Ontario fish testing program, and the "Stay Beautiful Ontario" broadcast campaign.

## Special Projects

As a result of continuing problems of discharges of liquid manure into streams causing major kills of fish, a public information/education program was directed at farmers on the seriousness of the problem and the measures necessary to bring it under control.

"Operation Skywatch", utilizing the volunteer services of 85 women pilots, was conducted for the third year. The pilots, members of the Ninety-Nines Inc., an international organization, flew environmental patrols along the shoreline of the Ottawa River, St. Lawrence River and the Great Lakes, as part of an environmental detection activity.

## Displays and Exhibits

The Ministry maintained exhibits at the Canadian National Exhibition in Toronto, the International Plowing Match at Woodstock, the Do-It-Yourself Show in Toronto and exhibitions in Sault Ste. Marie, Thunder Bay and Ottawa. An estimated audience of over 150,000 people visited these major exhibits. In addition, the Ministry also participated in eight smaller exhibits.

## Public Meetings

Information "open houses", citizen information committee meetings, public meetings and project-oriented community education programs were conducted throughout the Province, largely as part of the Ministry's programs concerning acid rain and industrial waste facility proposals. During the year, 20 such meetings attended by over 4,000 people were held.

The Branch also co-ordinated the official opening ceremonies for 11 sewage and water treatment systems across the Province.

## Education

Under the Ministry's Environmental Explorations Program, four university students visited 128 schools, resident camps and provincial parks across Ontario. The program which runs for 14 weeks during June, July and August, is designed to promote an interest and a concern for our environment and to provide appropriate information to both children and adults. Approximately 45,000 people were reached directly and indirectly through the program.

For the fourth year, the Ministry sponsored an environmental workshop for special education teachers at the Bolton Outdoor Education Centre. Sixty-six teachers attended the three-day workshop, staged under Ministry auspices, by instructors and session leaders from outdoor education centres, conservation areas, universities and boards of education.

The 27th Ontario Industrial Wastes Conference, which was attended this year by over 600 delegates, was also a major public education event.

## Films/Photography

Ministry films were used in 1,382 showings before a total audience of 46,854 persons. In addition, four films were booked for 61 showings on television, to a total audience estimated at 762,000.

## Library Services

Library Services operates a main library at the head office in Toronto and the library at the main laboratory on Resources Rd., Rexdale. Library staff responded to 15,229 reference requests, lent 25,428 books and processed 51,472 photocopies of information material in 1980-81. The libraries acquired 1,200 technical books and documents, subscribed to 227 journals which were widely circulated to Ministry staff, conducted 1,384 computer searches for scientific material, and acquired 3,242 U.S. Government documents on microfiche.

The public reading room was opened at the main library during the year and was used by over 1,660 people, most of whom were engaged in research.

# Personnel Services Branch

Director: R.E.B. Burns

Personnel Services Branch designed the necessary framework for a manpower planning program within the Ministry.

Occupational Health and Safety Committees were established in co-operation with the Union, in designated areas of the Province to meet the requirements of the Occupational Health and Safety Act. The committees met on a regular basis to review matters of mutual interest.

The Training and Certification Section conducted 67 courses, workshops and seminars which were attended by 671 Ministry and 1,217 non-Ministry personnel. Thirty-three trainees were from Provinces other than Ontario and 25 were from abroad. Sixty-two Ministry personnel were recertified and five Ministry and two non-Ministry personnel obtained initial certification in the identification of opacities of visible emissions. Fourteen Ministry and 14 non-Ministry personnel were certified as Noise Control Officers Class 2, having completed parts 1 and 2 of the Acoustics Technology Course. New workshops added to the program included storm-water management, instructor seminar, environmental assessment seminar, a wood-burning seminar and an environmental investigators course.

During the same period, the Ministry ran three management development courses for 60 staff members.

The Ministry also established targets for the staffing of positions by women in those categories which were considered to be under represented. Targets for all categories were either met or exceeded during the fiscal year.

Currently, 50 per cent of general information publications are available in French, including literature pertaining to major environmental issues, such as acid rain. Translations of the Ministry's legislation are underway. Audio-visual materials are also produced in French.

The openings of the Hearst, Blind River and Killaloe treatment plants were conducted in both French and English. Four of the Ministry's exhibits were bilingual and French-language radio commercials were broadcast as part of the "Stay Beautiful, Ontario" campaign.

# French Language Services

Co-ordinator: N. Vakharia

The goal of French Language Services is to ensure provision of a full-range of Ministry services in areas of the Province where there are significant concentrations of French-speaking Ontarians.

Currently, bilingual staff are situated in Ministry offices located in: Cornwall, Ottawa, Peterborough, Stoney Creek, Sudbury, Timmins and Toronto. In 1980-81, 26 employees participated in french language training.

# boards and commissions

## Waste Management Advisory Board

Chairman: R.H. Woolvett

The Waste Management Advisory Board was established in 1975 by Order-in-Council to provide advice to the Minister of the Environment on matters relating to the management of waste in Ontario, with particular emphasis on the means of reducing waste generation and recovering valuable materials from the waste stream.

The board's terms of reference are as follows:

- "to provide advice to the Minister on any matter which the Minister may refer to the Board in writing;
- "to provide comment or advice directly to the Minister on any matter of high public concern in the short, medium, or long term related to the reduction and management of wastes in Ontario;
- "to review and advise the Minister directly on the priorities or action by the Province in the total area of waste management, and also
- "to comment on the effectiveness of existing waste management programs and activities."

During the fiscal year of 1980-81, the Waste Management Advisory Board comprised 11 members. Nine board meetings were held over a period of 18 full days. In addition, 36 meetings were held by seven board committees.

On December 5, 1980, Mrs. Diana Pilsworth was appointed Vice-Chairman of the board by Order-in-Council.

### New Programs

In the area of source separation, a project was assigned to a consulting firm to set up a system to monitor the supply and demand for recyclable materials; a funding program to aid in the implementation of source separation projects was developed in conjunction with the Waste Management Branch; a pilot program to recover used motor oil from do-it-yourself oil changers was conducted for a second season in Kitchener-Waterloo, co-sponsored by the Waste Management Branch and Environment Canada; guidelines on how to recover oil from this

sector were also initiated; meetings were held with major users of old corrugated containers to discuss increased recovery from local sources; a study was commenced to evaluate the markets for waste glass and to determine mechanisms for increasing the use of this material.

In the packaging area, the board and the Ministry launched the second biennial student packaging design competition and developed a slide show for use in post-secondary schools; the board became a member of an Ad Hoc committee established to look at the methods of handling pesticides containers; on board initiative, the prohibition was lifted against the introduction of new types of refillable containers for milk; monitoring by the board of the milk packaging situation continued, as it did for carbonated soft drink containers.

In other areas, the board commissioned an update of Ontario figures for solid waste generation and composition; it initiated an educational program for schools, including the purchase of educational posters; it developed and forwarded to the Minister a position paper on the management of liquid industrial waste.

Two new board committees were formed; one on education and one on public participation.

# The Environmental Assessment Board

*Chairman: K.H. Sharpe

The Environmental Assessment Board conducts public hearings on environmental issues under the following legislation and Orders-in-Council:

| Legislation | No. of Hearings in 1980-81 |
|---|---|
| The Environmental Assessment Act | 1 |
| The Ontario Water Resources Act | 18 |
| The Environmental Protection Act | 10 |
| Orders-in-Council | 4 |

At the end of the 1980-81 fiscal year the Board had 16 members.

A detailed report on the Board's activities may be obtained by writing to the Board at 1 St. Clair Avenue West, Toronto, Ontario M4V 1K7.

**B.E. Smith was appointed Chairman on the retirement of K.H. Sharpe in October 1980.*

# The Pesticides Advisory Committee

Chairman: Dr. G.S. Cooper

The Pesticides Advisory Committee recommended several changes to Ontario Regulation 618/74; reassessed 14 previously classified compounds, 10 of which were placed in Schedule 1; reviewed and evaluated the environmental impact, toxicity and hazard of four new or previously non-classified active ingredients; evaluated 210 newly registered pesticide products and recommended for each a classification for storage, sale and use in Ontario. The committee received 54 research proposals, 21 of which were funded by the Ministry through the committee at a total amount of $199,270.

A two-day research seminar sponsored by the Ministry was held in January, 1981. The 75 delegates who attended were drawn from federal and provincial government agencies, universities, and the chemical industry.

Sixteen committee meetings were held during the year. In addition to the work surrounding the classification of pesticide products, the current

scientific data of a number of pesticide compounds were updated and evaluated, and all provincial publications dealing with pesticides were reviewed.

# Farm Pollution Advisory Committee

Chairman: O. Crone

Consisting of four professional farmers, this committee provides objective assessments of farm environmental situations as requested by Ministry officials. The committee visits farms to investigate complaints and make recommendations concerning manure storage and spreading, cultivation, yard drainage and ventilation of livestock and poultry buildings.

In 1980, the committee investigated two hog farms, one cattle feed lot and one small mixed operation.

Rural land severances near livestock operations continued to be a major problem as operations became larger and some local residents objected to the associated odours. As in the previous year, manure discharge into watercourses was a major problem in some areas.

# The Environmental Appeal Board

Chairman: L.C. DeGroot

Established under The Environmental Protection Act, 1971, the Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry of the Environment or local health units. The board consists of 13 part-time members, including the Chairman, from various occupations and parts of the Province.

In 1980-81, the board received 39 valid appeals. Approximately 66 per cent of the appeals concerned decisions of local health units on private sewage systems. The remaining appeals resulted from Ministry of the Environment decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control.

The board held 40 days of hearings in 1980-81. It resolved 28 of the appeals received during the year as well as ten appeals from the previous year. At year-end, decisions remained to be issued, or hearings held, on nine appeals.

# The Royal Commission on the Northern Environment

Chairman: J.E.J. Fahlgren

The Royal Commission on the Northern Environment has a mandate to study the effects of major enterprises north of the 50th parallel on the natural, social and economic environment, to investigate the feasibility of alternative undertakings, and to inquire into the application of the Environmental Assessment Act.

In 1980-81 the commission's emphasis and direction was based on two main aspects of fulfilling its mandate. One is to find a way to help guarantee that northern development takes place in harmony with and not at the expense of the residents and natural environment of northern Ontario. The other is to discover a mechanism to help ensure that northerners have a strong say in determining how the future of the north should proceed.

According to these directions, the commission initiated approaches wherein major sectors of the public could become involved in gathering and responding to information essential for fulfilling the commission's mandate.

A major research activity which complements this focus is a pilot study in northwestern Ontario undertaken in conjunction with the Kayahna Tribal Council. Its objective is to determine methods to assess and evaluate socio-economic impacts of development in the northern environment.

The commission is also investigating the effectiveness of the Environmental Assessment process by means of several case studies. Among the studies undertaken in 1980-81 on this matter were an investigation of the Detour Lake Access Road, of the proposed Onakawana lignite development, and of the nature and extent of public involvement in the West Patricia Land Use Planning process.

Two other projects were undertaken in the past year: a study of Indian education north of 50° parallel, and a project in conjunction with Fort Hope Reserve to anticipate the advantageous and detrimental effects of a road on the community and to make a sound decision on the matter.

As well, two studies begun the year before were well underway in 1980-81: a study of the economic future of forestry and related activities in Ontario north of 50° parallel and a study by Laurentian University examining the factors governing the prospects for mining development north of 50° parallel. Work continued on a geographical background study of the area which includes a description, analysis and atlas of natural resources, resource-using activities and settlement in Ontario north of 50° parallel; a separate atlas constitutes an interpretive summary of the geographical study's main findings.

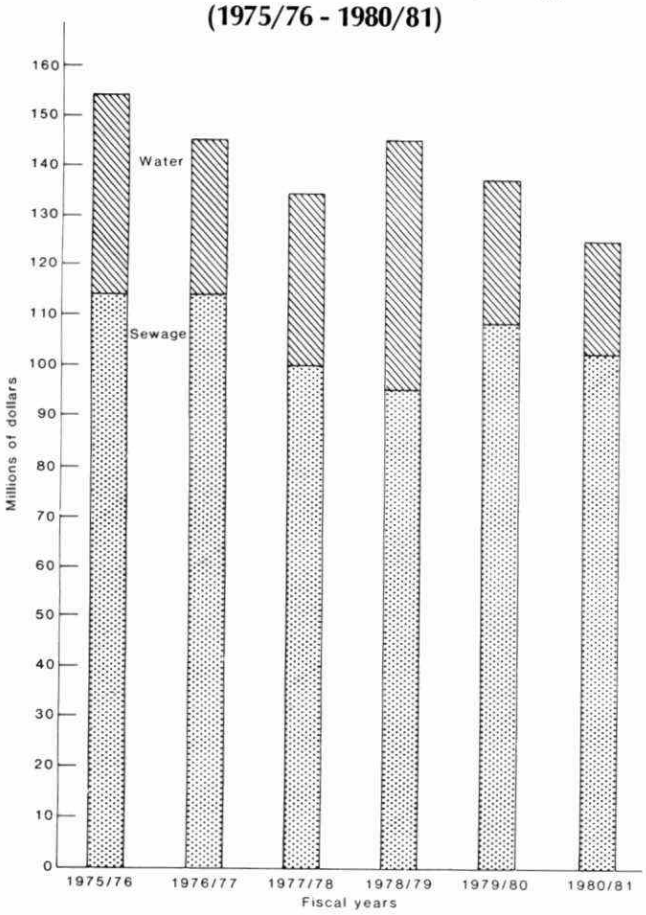
In the past fiscal year, under its Public Interest Subsidy program, the commission funded 46 projects in the amount of $252,000 and published 28 reports of selected projects which are available and of interest to the public at large.

As part of its overall objective and main thrust, and an expanded Public Interest Subsidy policy, the commission began discussions with major segments of the public north of 50°, such as the Windigo and Pehtabun communities of Treaty #9, for funding arrangements to enable them to participate fully in the activities related to the commission's central concerns: controlled development and increased public involvement in decision-making.

# appendices

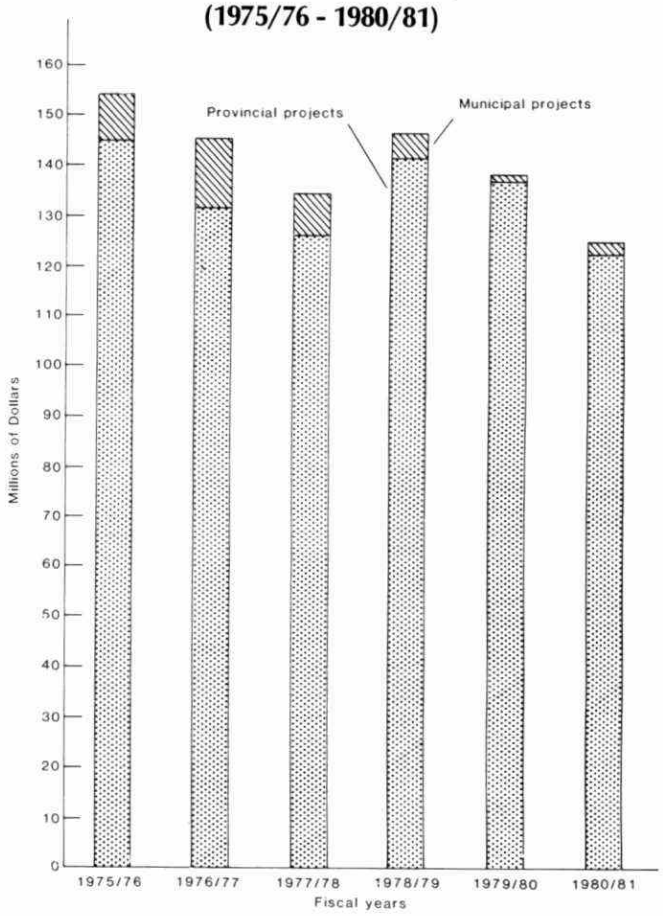
## CAPITAL CONSTRUCTION PROGRAM

### Annual Total Expenditure by Project Type (1975/76 - 1980/81)




Graph 1

### Annual Total Expenditure by Class (1975/76 - 1980/81)




Graph 2

### Annual Total Expenditure by Project Type

| Fiscal Year | Sewage | Water | Total* ($ millions) |
|---|---|---|---|
| 1972/73 | 54.4 | 26.0 | 80.4 |
| 73/74 | 68.4 | 13.1 | 81.5 |
| 74/75 | 94.8 | 32.0 | 126.8 |
| 75/76 | 114.8 | 40.1 | 154.9 |
| 76/77 | 114.8 | 31.2 | 146.0 |
| 77/78 | 101.0 | 34.1 | 135.1 |
| 78/79 | 96.6 | 50.7 | 147.3 |
| 79/80 | 110.6 | 28.9 | 139.5 |
| 80/81 | 101.9 | 21.7 | 123.6 |

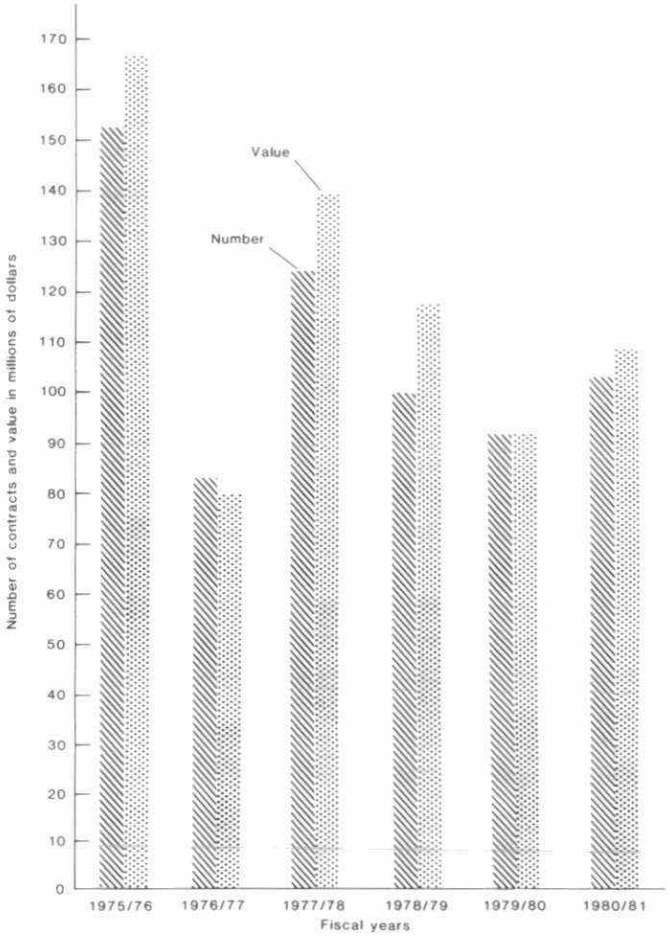
### Annual Total Expenditure by Class

| Fiscal Year | Provincial Projects | Municipal Projects | Total* ($ millions) |
|---|---|---|---|
| 1972/73 | 77.6 | 2.8 | 80.4 |
| 73/74 | 75.5 | 6.0 | 81.5 |
| 74/75 | 115.4 | 11.4 | 126.8 |
| 75/76 | 145.2 | 9.7 | 154.9 |
| 76/77 | 131.8 | 14.2 | 146.0 |
| 77/78 | 127.0 | 8.1 | 135.1 |
| 78/79 | 142.9 | 4.4 | 147.3 |
| 79/80 | 138.3 | 1.2 | 139.5 |
| 80/81 | 121.7 | 7.9 | 123.6 |

*Includes costs of engineering, property and miscellaneous items as well as contract prices.

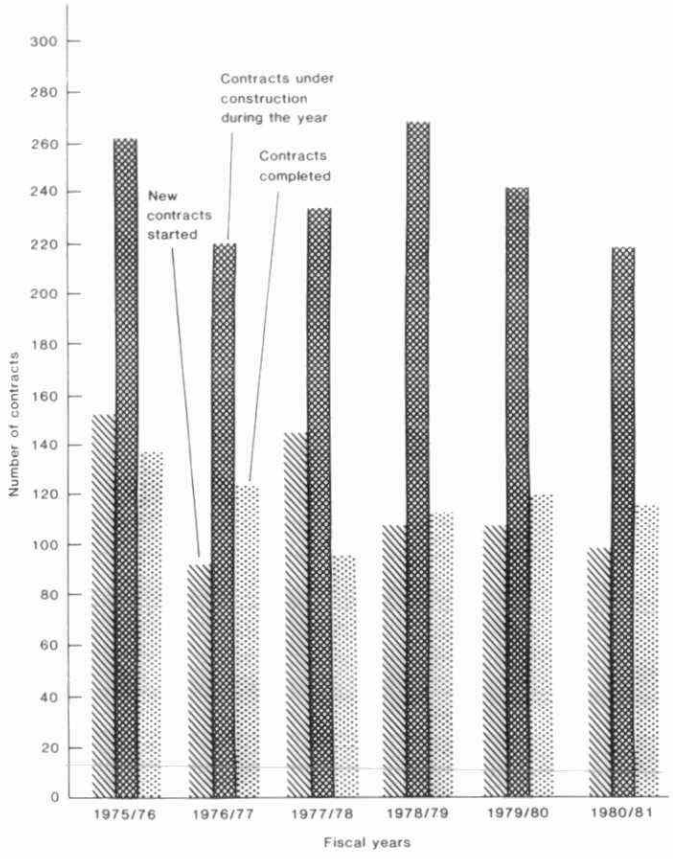
# CAPITAL CONSTRUCTION PROGRAM

## Number and Value of Contracts Tendered Anually (1975/76 - 1980/81)




Graph 3

## Annual Volume of Activity (1975/76 - 1980/81)




Graph 4

### Number and Value of Contracts Tendered Annually

| Fiscal Year | Number | Value ($ Millions) |
|---|---|---|
| 1972/73 | 99 | 72.4 |
| 73/74 | 108 | 91.3 |
| 74/75 | 92 | 84.1 |
| 75/76 | 153 | 167.6 |
| 76/77 | 84 | 79.6 |
| 77/78 | 125 | 140.5 |
| 78/79 | 99 | 116.3 |
| 79/80 | 93 | 93.0 |
| 80/81 | 104 | 110.2 |

### Annual Volume of Activity

| Fiscal Year | (Number of Contracts) Started | Under Construction | Completed |
|---|---|---|---|
| 1972/73 | 88 | 166 | 92 |
| 73/74 | 108 | 182 | 82 |
| 74/75 | 102 | 202 | 93 |
| 75/76 | 153 | 262 | 139 |
| 76/77 | 92 | 215 | 124 |
| 77/78 | 145 | 236 | 96 |
| 78/79 | 109 | 249 | 115 |
| 79/80 | 110 | 244 | 122 |
| 80/81 | 97 | 219 | 113 |

## NORTHWESTERN REGION
## SEWAGE AND WATER WORKS
## COMPLETED IN 1980-81

| Location | Project | Value (in dollars) |
|---|---|---|
| Rossport | water intake/pumping station/ chlorination/distribution system | $389,000 |
| Rainy River | water filtration plant | 125,672 |
| Atikokan | sewage treatment plant, including phosphorus removal, pumping stations and major trunk sewers | 2,367,604 |
| Longlac | expansion of sewage treatment plant | 555,299 |
| Nakina | sewage treatment plant, including phosphorus removal, pumping stations and collector system | 359,247 |
| Red Lake | extension of water distribution and sewage collector systems | 250,971 |
| Sioux Lookout | phase 1 completion of waterworks project, construction of major trunks across town | 159,972 |

## NORTHEASTERN REGION
## WATER AND SEWAGE PROJECTS
## COMPLETED IN 1980-81

| Location | Project | Value (in dollars) |
|---|---|---|
| Township of Temagami | new water plant | $225,000 |
| | new sewage plant | 250,000 |
| City of North Bay | new pump in water pumphouse | 1.4 million |
| Sturgeon Falls | new trunk watermain system | 1.2 million |
| South River | new well | 120,000 |
| Chapleau | renovations to sewage treatment plant | 25,000 |
| Town of Onaping Falls | new water and sewage services | 2.8 million |
| Town of Rayside Balfour | new water storage tank | .5 million |
| Town of Valley East | extension to water supply system | 1.8 million |
| Township of Casimir, Jennings and Appleby | new sewage treatment lagoon and sewers | 1.1 million |
| Town of Gore Bay | new lagoon, pumping stations and sewers | 2.4 million |

**SOUTHEASTERN REGION**
**WATER AND SEWAGE WORKS**
**COMPLETED IN 1980-81**

| Location | Project | Value (in $ millions) |
|---|---|---|
| Village of Iroquois | expansion of sewage treatment plant | $1.24 |
| City of Brockville | expansion of plant for phosphorus removal | 1.3 |
| Village of Wellington | waste treatment plant and sewer collector system | 4.5 |
| Village of Cobden | waste treatment plant | |
| Town of Hawkesbury | plant modernized and upgraded | 1.0 |
| City of Brockville | installation of filtration facilities | 1.8 |
| Township of Gloucester | installation of water distribution system | 2.15 |

**WEST CENTRAL REGION**
**WATER POLLUTION CONTROL PROJECTS**
**COMPLETED IN 1980-81**

| Location | Project | Value (in dollars) |
|---|---|---|
| City of Guelph | plant expansion including nitrification & filtration | $6 million |
| Town of Shelbourne | new plant including tertiary treatment | 2.5 million |
| Village of St. George | new plant and sewers | 2.4 million |
| City of Brantford | expansion of a secondary treatment plant | 10.5 million |
| Village of Elora | plant expansion and sanitary sewers | 3.5 million |
| Port Colborne | secondary sewage treatment plant | 5 million |
| St. Williams | upgrading and expansion of water works | 105,000 |

## CENTRAL REGION
## WATER AND SEWAGE FACILITIES
## COMPLETED IN 1980-81

| Location | Project | Value (in dollars) |
|---|---|---|
| Township of Mara (Fern Resort) | completion of seasonal discharge lagoon | $58,000 |
| Metro Toronto | | |
| 1) Humber Sewage Treatment Plant | plant expansion | 13.5 million |
| 2) Highland Creek Sewage Treatment Plant | plant expansion | 13 million |
| 3) Easterly Plant | water filtration plant | 66 million |
| Town of Brock | new plant and extension of lagoon system | 2.5 million |
| Town of Pickering Duffin Creek Sewage Treatment Plant | new plant | 8 million |
| Burlington Water Plant | upgrading program | 4.47 million |

## SOUTHWESTERN REGION
## WATER AND SEWAGE PROJECTS
## COMPLETED IN 1980-81

| Location | Project | Value (in dollars) |
|---|---|---|
| Village of Neustadt | complete collection and treatment system | $1.17 million |
| City of Woodstock | expansion of secondary sewage treatment facilities and the addition of nutrification | 3.5 million |
| Town of Parkhill | sewage works and collection system | 3.5 million |
| Township of Blandford-Blenheim (Village of Plattsville) | sewage works utilizing a seasonal retention lagoon | 2.3 million |
| Township of Anderdon | sewage collection system and a seasonal retention lagoon | 3.57 million |
| Town of Petrolia | expansion of sewage collection and treatment works | 9.2 million |
| Village of Thedford | sewage collection and treatment works utilizing a lagoon | 1.8 million |

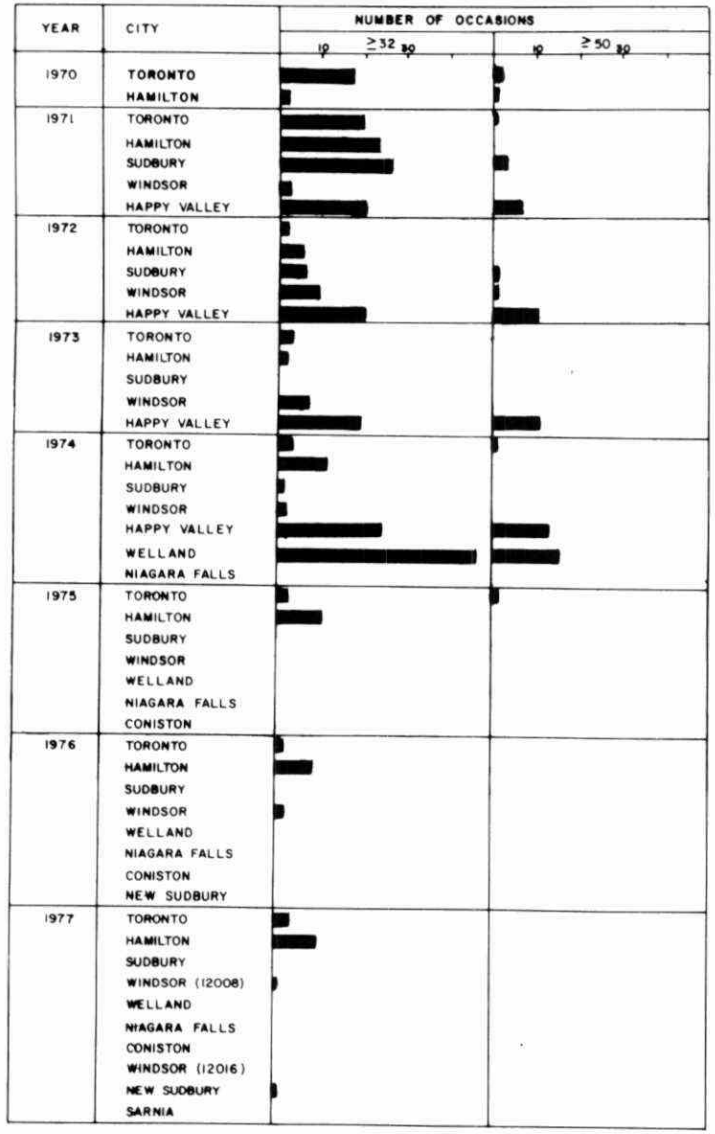
**SOUTHWESTERN REGION Cont'd**

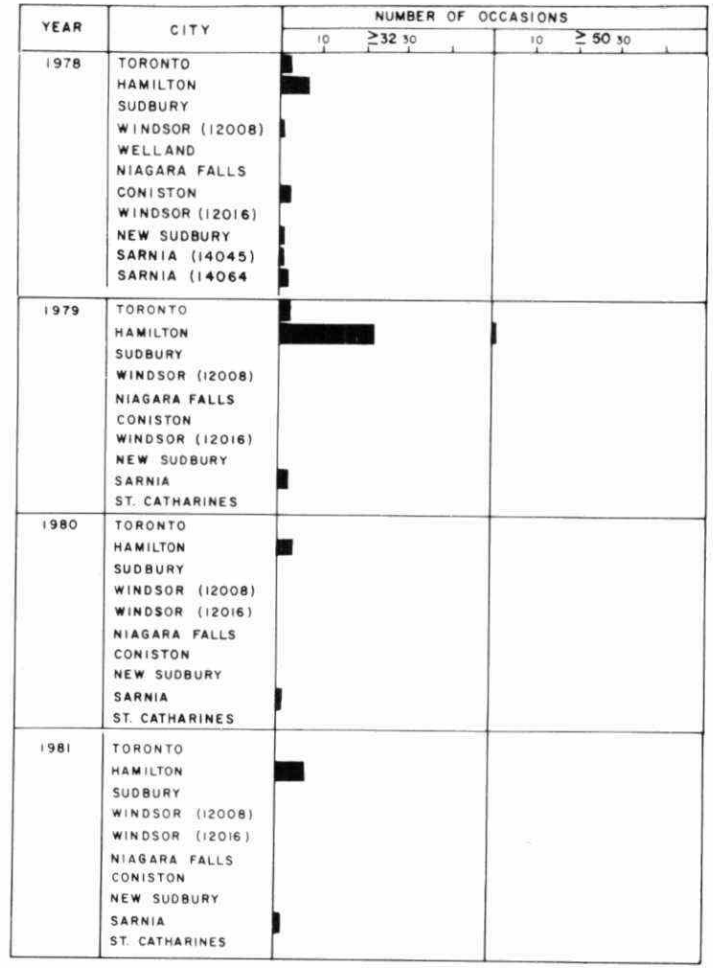
| Location | Project | Value (in dollars) |
|---|---|---|
| Village of Wyoming | sewage treatment and collection works | $3.7 million |
| Township of Moore | collection system | 1.2 million |
| Township of Blandford-Blenheim | provincial project to supply and distribute water | 1.2 million |
| Town of Walkerton | well | 48,000 |
| Village of Tara | well | 50,000 |
| Town of Seaforth | two wells | 59,000 |
| Township of Stephen (Dashwood) | watermains and a connection to the Lake Huron Water Supply System | 838,000 |

# ONTARIO'S AIR POLLUTION INDEX

**DATE STARTED**

| | |
|---|---|
| TORONTO | MARCH 23, 1970 |
| HAMILTON | JUNE 15, 1970 |
| SUDBURY | JANUARY 16, 1971 |
| WINDSOR | MARCH 19, 1971 |
| HAPPY VALLEY | MAY 13, 1971 (CLOSED JAN. 1975) |
| WELLAND | JAN. 1, 1974 (CLOSED OCT. 26, 1978) |
| NIAGARA FALLS | NOVEMBER 1, 1974 |
| CONISTON | FEBRUARY 18, 1975 |
| NEW SUDBURY | MARCH 1, 1976 |
| SARNIA (14049) | DEC. 1, 1977 (CLOSED AUG. 30, 1978) |
| SARNIA (14064) | SEPTEMBER 1, 1978 |
| ST. CATHARINES | SEPTEMBER 14, 1979 |



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